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COST OF NATIONAL PREVENTION SYSTEMS FOR ANIMAL DISEASES AND ZOONOSES

in Developing and Transition Countries

European Commission

World Bank

The World Organisation for Animal Health (OIE)

Cost of National Prevention Systems for Animal Diseases and Zoonoses in Developing and Transition Countries

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Contents

Acronyms

AGDP: Agricultural Gross Domestic Product

AH: Animal Health

AI: Avian Influenza

BIP: Border Inspection Post

CAHW: Community Animal Health Worker

CBPP: Contagious Bovine Pleuropneumonia

CMC: Crisis Management Centre

CSF: Classical Swine Fever

CVO: Chief Veterinary Officer

EC: European Commission

ESS: Epidemiological Surveillance System

FAO: Food and Agriculture Organization

FMD: Foot and Mouth Disease

GDP: Gross Domestic Product

GNI: Gross National Income

HPAI: Highly Pathogenic Avian Influenza

IBR/IPV: Infectious Bovine Rhinotracheitis

IFRI: *Institut Français des Relations Internationales*

IIT: Intra-Industry Trade

IMF: International Monetary Fund

NASDA: National Association of State Departments of Agriculture (USA)

NGO: Non-Governmental Organisation

NHA: National Health Accounts

NPS: National Prevention System

OECD: Organisation for Economic Cooperation and Development

OIE: World Organisation for Animal Health

PACE: Pan-African Programme for the Control of Epizootics

PPP: Purchasing Power Parity

PVS: OIE-PVS Tool for the Evaluation of Performance of Veterinary Services

SPS: Sanitary and Phytosanitary

TAHC: Terrestrial Animal Health Code (OIE)

TAD: Trans-boundary Animal Disease

TLU: Tropical Livestock Unit

TOR: Terms of Reference

UNDP: United Nations Development Programme

VLU: Veterinary Livestock Unit

VS: Veterinary Services

WB: World Bank

WHO: World Health Organisation

WTO: World Trade Organisation

Glossary[1]

Active surveillance: Any activity which is frequent, intensive and aims at establishing the presence or absence of a specific disease.[2]

Animal disease prevention: In the context of the study, this term is understood as precautionary measures, such as surveillance, biosecurity and border controls, aimed at minimising the risks of outbreaks of epidemic diseases. This includes prevention of trans-boundary animal diseases (TADs),[3] but is not limited to them.

Animal identification: The combination of the identification and registration of an animal individually, with a unique identifier, or collectively by its epidemiological unit or group, with a unique group identifier.[4]

Animal identification system: The inclusion and linking of components such as identification of establishments/owners, the person(s) responsible for the animal(s), movements and other records with animal identification.[4]

Animal traceability: The ability to follow an animal or group of animals during all stages of its life.[4]

Biosecurity: Biosecurity is a strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) that analyse and manage risks in the sectors of food safety, animal life and health, and plant life and health, including associated environmental risk. Biosecurity covers the introduction of plant pests, animal pests and diseases, and zoonoses, the introduction and release of genetically modified organisms (GMOs) and their products, and the introduction and management of invasive alien species and genotypes. *Biosecurity* is a holistic concept of direct relevance to the sustainability of agriculture, food safety, and the protection of the environment, including biodiversity.[5]

Border post: Any airport, or any port, railway station or road checkpoint open to international trade of commodities, where import veterinary inspections can be performed.[4]

Capital expenditure: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time.[6]

Capital transfers: Transactions in-cash or in-kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred.[7]

Compartment: An animal subpopulation contained in one or more establishments under a common biosecurity management system with a distinct health status with respect to a specific disease or specific diseases for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade.[4]

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1 Some definitions presented in this study are those of the authors and were drafted solely for the purpose of this study; they do not necessarily represent the views of the World Organisation for Animal Health (OIE).

2 FAO 1999.

3 Horst *et al.* 1999, Otte, Nugent & McLeod 2004.

4 OIE 2008c.

5 FAO 2003.

6 Civic Consulting on basis of WHO 2003.

7 WHO 2003.

Competent Authority: The Veterinary Authority or other Governmental Authority of an OIE Member having the responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and recommendations in the Terrestrial Code in the whole territory.[4]

Consumption of fixed capital: Reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings, etc.

Disinfection: The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases, including zoonoses; this applies to premises, vehicles and different objects which may have been directly or indirectly contaminated.[4]

Early detection system: System under the control of the Veterinary Services for the timely detection and identification of animal diseases. Characteristics of the system must include: a) representative coverage of target animal populations by field services; b) ability to undertake effective disease investigation and reporting; c) access to laboratories capable of diagnosing and differentiating relevant diseases; d) a training programme for veterinarians and para-veterinarians for detecting and reporting unusual disease occurrence.[4]

Emerging disease: New infection resulting from the evolution or change of an existing pathogenic agent, a known infection spreading to a new geographic area or population, or a previously unrecognized pathogenic agent or disease diagnosed for the first time and which has a significant impact on animal or public health.

Epidemiological surveillance: The investigation of a given population or subpopulation to detect the presence of a pathogenic agent or disease; the frequency and type of surveillance will be determined by the epidemiology of the pathogenic agent or disease, and the desired outputs.[8]

Eradication: The elimination of a pathogenic agent from a country or zone.[4]

Externalities: Costs or benefits borne by others who are not party, they are external, to a private market transaction.

Functional units: Functional units consist of the main departments/units of providers of the National Prevention System (NPS) at the central and sub-national levels (see section 2.3.4).

Functions: Specific types of services provided and activities performed, either within the boundary of the National Prevention System, or outside (see section 2.3.3).

International dollars: To ease comparisons between countries, local currencies can be converted in international dollars using implied Purchasing Power Parities conversion rates (see below, Purchasing Power Parities).

Laboratory: A properly equipped institution staffed by technically competent personnel under the control of a specialist in veterinary diagnostic methods, who is responsible for the validity of the results. The Veterinary Authority approves and monitors such laboratories with regard to the diagnostic tests required for international trade.[4]

Market: A place where animals are assembled for the purpose of trade or sale.[4]

Median: Number separating the higher half of a sample from the lower half.

Monitoring: The intermittent performance and analysis of routine measurements, aimed at detecting changes in the environment or health status of a population.[4]

National Prevention System (NPS): Sum of all services and activities of the public Veterinary Services and other relevant public providers at national and sub-national level allowing early

[8] OIE 2008c.

detection and rapid response to emerging and re-emerging animal diseases, including the services of accredited private veterinarians undertaking public service missions financed from the public budget.

Notifiable disease: A disease listed by the Veterinary Authority, and that, as soon as detected or suspected, must be brought to the attention of this Authority, in accordance with national regulations.[4]

Operating expenditures: Relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided.

Outbreak of disease or infection: The occurrence of one or more cases of a disease or an infection in an epidemiological unit.[4]

Passive surveillance: Most ordinary surveillance routinely carried out falls into the category of passive surveillance. In this case, there are routine programmes that run - usually partly directly visual, or indirect, relying on farmer interviews and notification - basically to survey the landscape for livestock diseases and to detect and changes in status. This is probably the most important, and is a key element in early warning. The word “passive” should be seen as a characterisation of technique and not a sign of lowered importance of the work done.[9]

Prevalence: The total number of cases or outbreaks of a disease that are present in a population at risk, in a particular geographical area, at one specified time or during a given period.[4]

Private veterinarian conducting public services missions: Person who has effectively conducted public services missions financed from the public budget in a specific period of time, as defined in the study.

Purchasing Power Parities: The PPP rate is defined as the number of units of a country’s currency that is required to buy the same amount of goods and services in the country as one US$ would buy in the US. PPP as a rate of conversion ensures that money exchanged for a dollar buys the same volume of goods and services in every country. By equalizing prices, PPP rates deliver a measure of relative GDP which is based on what constitutes "real" income, the volume of goods and services embodied in GDP. The method of using PPP is analogous to measuring GDP in different years at fixed base year prices.[10]

PVS: OIE-PVS Tool for the Evaluation of Performances of Veterinary Services (formerly Performance, Vision and Strategy). The OIE-PVS Tool is designed to assist VS to establish their current level of performance, to identify gaps and weaknesses regarding their ability to comply with OIE International Standards, to form a shared vision with stakeholders (including the private sector) and to establish priorities and carry out strategic initiatives.[11]

PVS level of advancement: The OIE-PVS Tool is based on four fundamental components, each divided into six to twelve critical competencies. For each critical competency, qualitative levels of advancement are described. A higher level of advancement assumes that the VS are complying with the preceding (non 1) levels (i.e. level 3 assumes compliance with level 2 criteria; level 5 assumes compliance with level 4 and preceding criteria; etc.).[11] Each critical competency has 5 levels of advancement; level 1 corresponding to non-compliance and level 5 to the highest level of advancement attainable.

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[9] FAO 1999.

[10] World Bank 2009b.

[11] OIE 2008b.

Slaughterhouse/abattoir: Premises, including facilities for moving or lairaging animals, used for the slaughter of animals to produce animal products and approved by the Veterinary Services or other Competent Authority.[4]

Stamping-out policy: Carrying out under the authority of the Veterinary Authority, on confirmation of a disease, the killing of the animals which are affected and those suspected of being affected in the herd and, where appropriate, those in other herds which have been exposed to infection by direct animal to animal contact, or by indirect contact of a kind likely to cause the transmission of the causal pathogen. All susceptible animals, vaccinated or unvaccinated, on an infected premises should be killed and their carcasses destroyed by burning or burial, or by any other method which will eliminate the spread of infection through the carcasses or products of the animals killed.[4]

Technician (veterinary or laboratory technician): Person who conducts specific tasks under the responsibility and direction of a veterinarian.

Vaccination: The successful immunisation of susceptible animals through the administration of a vaccine comprising antigens appropriate to the disease to be controlled.[4]

Veterinarian: Person registered or licensed by the relevant Veterinary Statutory Body of a country to practice veterinary medicine/science in that country.[4]

Veterinary Authority: The Governmental Authority of an OIE Member, comprising veterinarians, other professionals and paraprofessionals, having the responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and recommendations in the Terrestrial Code in the whole territory.[4]

Veterinary Livestock Unit (VLU): Equivalence unit for the estimate of annual veterinary cost and care.[12]

Veterinary paraprofessional: Person who carries out certain designated tasks delegated to them under the responsibility and direction of a veterinarian. Veterinary paraprofessionals include trained Community Animal Health Workers, livestock inspectors, veterinary technicians, and, in the case of veterinary laboratories, laboratory technicians. According to the OIE Terrestrial code,[4] a veterinary paraprofessional is a person who, for the purposes of the Terrestrial Code, is authorised by the Veterinary Statutory Body to carry out certain designated tasks (dependent upon the category of veterinary paraprofessional) in a territory, and delegated to them under the responsibility and direction of a veterinarian. The tasks authorized for each category of veterinary paraprofessional should be defined by the Veterinary Statutory Body depending on qualifications and training, and according to need. However, veterinary paraprofessionals operating in developing countries may not always be authorised by the Veterinary Statutory Body.

Veterinary Services: The governmental and non-governmental organisations that implement animal health and welfare measures and other standards and recommendations in the Terrestrial Code in the territory. The Veterinary Services are under the overall control and direction of the Veterinary Authority. Private sector organisations, veterinarians or veterinary paraprofessionals are normally accredited or approved to deliver functions by the Veterinary Authority.

Veterinary Statutory Body: An autonomous authority regulating veterinarians and veterinary paraprofessionals.[4]

Zoonosis: Any disease or infection which is naturally transmissible from animals to humans.[4]

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[12] OIE 2008a, p.13.

Key conclusions

The World Organisation for Animal Health (OIE) has commissioned Civic Consulting to conduct a study on the Cost of National Prevention Systems for Animal Diseases and Zoonoses in developing and transition countries. The aims of the study are twofold: (a) estimating the "peace time" costs of Veterinary Services allowing early detection and rapid response to emerging and re-emerging diseases in different regions, economies, animal health systems and eco-systems; and (b) developing economic indicators within the OIE-PVS Tool. The study is based on results of in-depth research in nine OIE member countries (Costa Rica, Kyrgyzstan, Mongolia, Morocco, Romania, Turkey, Uganda, Uruguay, Vietnam) and an extensive analysis of possible economic indicators. Key conclusions of the study include:

⇒ *Substantial differences in the public expenditure for the National Prevention System for Animal Diseases and Zoonoses exist between case study countries, reaching from 10 million international dollars to 167 million international dollars.* The average expenditure on the National Prevention System was 48.6 million international dollars in the baseline year 2007. Variations in expenditures between case study countries are clearly associated with differences in livestock population. Operational costs of the National Prevention System, when expressed on a per Veterinary Livestock Units (VLU) basis, therefore give a comparative measure of the level of service provision in relation to the quantitative requirements.

⇒ *In the case study countries, there is a close relationship between Gross Domestic Product (GDP) and the total public expenditures for the National Prevention System.* Differences in GDP explain to a large degree the variation in NPS expenditures. NPS expenditure appears to be mainly dependent on the country's ability to pay, rather than on the veterinary requirements. This may lead to a significant under funding of the NPS, most notably in low-income countries. In these cases Veterinary Services require a higher priority in the national budget allocation, and/or sustained external support to be able to effectively address global animal health challenges.

⇒ *Differences in NPS expenditures between countries on a per VLU basis are, at least partly, explained by differences in per capita incomes.* While the overall average NPS cost per Veterinary Livestock Unit for the seven countries amounts to 5.66 international dollars, the average for the three low-income countries, Uganda, Kyrgyzstan and Vietnam, is only 3.82 international dollars. The average for the two lower-middle-income countries, Mongolia and Morocco, is 5.28 international dollars, while that for the upper-middle-income countries, Costa Rica and Turkey, is 8.79 international dollars.

⇒ *Sub-national expenditures tend to increase relative to the centralised expenditures with increasing size of the national territory.* Operating expenditures associated with the National Prevention System are incurred either centrally, in or near the main centre of government, or dispersed more widely in provincial, regional or district locations. A high central expenditure in Costa Rica is clearly associated with a centralised structure in a relatively small country, whereas Turkey, Morocco and Vietnam, three of the largest countries in area, spent about three quarters of the total NPS operating expenditure at the sub-national level. Provided that both central and regional elements are included, the average total cost per VLU may be unaffected by the extent of decentralised expenditure.

⇒ *Spending patterns for different categories of expenditures vary across case study countries, however, this provides little explanation for differences in overall NPS expenditures.* Levels of staff costs and expenditures such as travel costs appear to be directly related to levels of *per capita* income of case study countries. Considerable differences in spending that depend on other factors are related to three categories: Fees for private veterinarians conducting public service mission (up to 0.96 international dollar/VLU), expenditures for vaccines (up to 1.57 international dollar/VLU), and compensation of livestock holders (up to 0.74 international dollar/VLU). In some other countries, spending for these items is zero or close to zero.

⇒ *There is no evidence that a stronger private veterinary sector reduces public NPS expenditures in the case study countries.* The relative strength of the private veterinary sector, expressed as the ratio of public to private veterinarians, appears to be related to the income level of the country. In the case study countries, both NPS expenditures and the relative importance of the private veterinary sector increase with a higher GNI *per capita.*

⇒ *The strong linear correlation between GDP and NPS expenditures for the case study countries can be used to estimate current National Prevention System expenditure.* However, this approach provides a rough estimation of the likely current level of funding of the NPS only, and *does <u>not</u> in any case determine the optimal level of NPS expenditures* in a given country. The only reliable and accurate method of obtaining data on NPS expenditures in other countries currently available is by means of direct measurement, using the methodology developed for this study.

⇒ *A quantitative expression of OIE-PVS Evaluation results would be helpful for assessing the degree of compliance with OIE International Standards on Quality of Veterinary Services in a systemic perspective.* In future refinements of the PVS Tool, the introduction of a more quantitative approach could be considered. Also, due to the cross-cutting character of several of the critical competencies used for the PVS Tool, it is currently difficult to correlate the costs for key NPS elements (e.g. veterinary diagnostic laboratories) to the results of a sub-set of PVS critical competencies related to this NPS element. It could therefore also be considered to refine and group critical competencies to allow a more direct correlation of PVS results and costs for key elements of the NPS.

⇒ *OIE member countries should collect data on staff numbers of the public Veterinary Services across all levels of government.* Although collection of such data would require additional efforts by member governments, this would hugely improve the basis for any future economic assessment of the National Prevention System, as staff costs account for up to three quarters of NPS operating expenditures in the case study countries. This could be encouraged by revising the reporting format for the annual OIE World Animal Health Report. A possible reporting format, suggested in this study, would differentiate between public and private veterinary personnel, differentiate the categories of veterinary personnel paid from the public budget and differentiate the type of activity of the personnel.

⇒ *A 'gold standard' or quality benchmark figures are needed from the OIE for comparison of NPS expenditures between countries, but assessments may be more effective if focused on key elements rather than on the total NPS expenditure at national level.* The results of this study suggest a gradual approach to derive benchmark values that provide guidance to countries for allocating their NPS expenditures effectively and efficiently, focusing on key elements of the National Prevention System (such as cost of surveillance, border inspection, diagnostic laboratory facilities).

⇒ *Consideration could be given to the development of a database of benchmark cost data concerning specific components of NPS expenditures.* The necessary data could be obtained during the PVS Evaluation or PVS Gap Analysis visit or, alternatively, through a visit of a specialist expert team. Benchmark cost data concerning key elements of the NPS would create a better basis for the design and budgeting of desired improvements in the NPS provisions in developing and transition countries, creating both a better basis for the budgeting process of specific countries and more transparency for donors.

Executive summary

The World Organisation for Animal Health (OIE) has commissioned Civic Consulting to conduct a study on the Cost of National Prevention Systems for Animal Diseases and Zoonoses in developing and transition countries. The aims of the study are twofold: (a) estimating the "peace time" costs of Veterinary Services allowing early detection and rapid response to emerging and re-emerging diseases in different regions, economies, animal health systems and eco-systems; and (b) developing economic indicators within the OIE-PVS Tool.[13] The study is based on a review of relevant literature, results of in-depth research in nine OIE member countries, and an extensive analysis of possible economic indicators.

I. Estimating the cost of National Prevention Systems for Animal Diseases and Zoonoses

Methodological challenges and approach followed

A major challenge for the study has been the absence of other, comparable studies in the animal health field. Previous studies mainly focused on specific regions, e.g. in Africa, or applied a much narrower definition of "epidemiological surveillance systems" than the definition of National Prevention System (NPS) used in this study, or focused on measures related to specific diseases rather than considering the overall system. A major element of the study has therefore been developing, testing and refining the methodological framework. In brief, the approach followed by this study was as follows:

1. *Definition of the boundary of the National Prevention System* – A definition of the NPS was developed that includes all public sector capacities for surveillance, early detection and rapid response (including services of accredited private veterinarians undertaking public service missions) and is also practicable for the cost assessment, which consequently focused exclusively on public sector expenditures (in the baseline year 2007).
2. *Identification of main functional units* – Main functional units of the NPS at central and sub-national level were defined, to allow comparisons of key cost centres within the National Prevention System across case study countries. Functional units at *central level* are central or federal public Veterinary Services (including veterinary inspection of live animal markets and slaughterhouses conducted at central level), the national veterinary laboratory, border inspection; Functional units at *sub-national level* are regional and local level public Veterinary Services (including veterinary inspection of live animal markets and slaughterhouses conducted at sub-national level), regional and local veterinary laboratories, veterinary units of municipalities.
3. *Development of approach for cost assessment* – The methodology for the cost assessment was developed taking into account best practices from the animal health and public health field. The cost assessment approach includes clearly defined rules for the use of budget data, the extrapolation of data, where required, and the calculation of depreciation (consumption of fixed capital) based on an inventory of NPS infrastructure, where applicable.
4. *Selection of case study countries* – A total of 13 candidate countries for case studies were selected on the basis of a set of criteria described in section 2.2 of this report. The

[13] The OIE-PVS Tool for the Evaluation of Performances of Veterinary Services is designed to assist Veterinary Services to establish their current level of performance, to identify gaps and weaknesses regarding their ability to comply with OIE international standards, to form a shared vision with stakeholders (including the private sector) and to establish priorities and carry out strategic initiatives.

countries cover different OIE regions and have different levels of compliance with OIE International Standards as expressed in the results of the PVS Evaluation, in line with the aim of the study to cover a wide range of different regions and situations.

5. *Data collection* – Data were collected through a review of literature and databases, a questionnaire survey, and country visits of the core expert team. Final data sets were obtained for a total of seven countries: Costa Rica, Kyrgyzstan, Mongolia, Morocco, Turkey, Uganda, and Vietnam. In addition, partly incomplete data sets were obtained for Uruguay and Romania.

6. *Comparative analysis of the costs of the National Prevention System in case study countries and analysis of factors that influence these costs* – Operating expenditures for the NPS as a whole and for main functional units for all case study countries were comparatively analysed, as well as different indicators/ratios to identify factors that may influence costs, and that could be used as economic indicators within the PVS Tool.

Overview of case study results

Total public expenditures on the National Prevention System for the seven case study countries for which a full data set is available are listed in the following Table together with other key data.

Key data of countries for which complete data set was available (2007)

OIE-Region	**Costa Rica** *The Americas*	**Kyrgyz-stan** *Europe & Central Asia*	**Mon-golia** *Asia*	**Mo-rocco** *Africa*	**Turkey** *Europe & Middle East*	**Uganda** *Africa*	**Vietnam** *Asia*	***Average***
NPS costs (000) intl. $	11,172	10,043	21,086	46,811	166,962	16,888[a]	67,356	*48,617*
NPS costs with donor programmes (000) intl. $	11,584	11,517	21,702	48,698	180,080	23,369[a]	72,619	*52,796*
Land area (000) km^2	51	200	1,567	447	784	241	329	*517*
Population (000)	4,398	5,258	2,604	30,852	73,888	30,930	85,140	*33,300*
GDP (PPP) million intl. $	46,021	10,508	8,426	126,943	885,905	32,767	221,614	*190,312*
Veterinary Livestock Units (000)	1,365	1,766	6,381	6,455	17,765	8,818	17,483	*8,576*
Number public veterinarians NPS	117	1,096	450	240	2,910	345	4,272	*1,347*
VLU / Number public veterinarians NPS	11,648	1,612	14,179	26,894	7,567	25,559	4,092	*13,079*

Source: Civic Consulting. For sources of data, see country tables in section 3.
Notes: (a) Fiscal year 1.7.2006 to 30.6.2007.
Median values are underlined (see the glossary on page 9 for a definition of *median*).

The arithmetic mean, or average, expenditure on the National Prevention System, for the seven countries is 48.6 million international dollars.[14] These figures are quoted net of donor support programmes, so they reflect only domestic spending on animal disease prevention. In the second row of the Table additional expenditure derived from foreign assistance programmes is included in the total NPS expenditure for each country. The only change in the ordering of the countries, in terms of total NPS expenditure is that the value for Uganda is raised above that for Mongolia. The following analyses of NPS expenditures in the case study countries are based on the total domestic expenditure excluding foreign assistance.

The data presented in the Table clearly underline the diversity of the sample. Less obvious are patterns in the data presented that could provide some insight concerning the relationship of different factors influencing the total cost of the National Prevention System. The study analyses possible reasons for differences between the case study countries in National Prevention System expenditures.[15]

Analysis of factors that influence total NPS costs in case study countries

Land area, population and livestock

Land area and human population: There are huge differences in land area between the case study countries. However, comparisons between countries suggest that there is no obvious association between land areas and total NPS costs. Mongolia, the largest country, with an area of over 1.5 million square kilometres, has a moderate level of NPS expenditure. Turkey, Vietnam and Morocco, with much smaller land areas have considerably higher total NPS expenditures. This absence of an association between land area and NPS expenditure may in part be due to differences in population density which is extremely low in Mongolia, compared with the other six countries, particularly Vietnam where population density is very high. However, the relationship between NPS expenditure and human population is still fairly weak.

Size of livestock sector: A Veterinary Livestock Unit (VLU) is an equivalence unit for the estimate of annual veterinary cost and care. For example, according to the definition one bovine requires the same annual veterinary cost and care as ten sheep or a hundred chickens. The total livestock population, measured in Veterinary Livestock Units is therefore, by definition, the most appropriate measure of the scale of veterinary service requirements. This is born out by the fact that Costa Rica and Kyrgyzstan have similar low livestock populations and report the lowest levels of NPS costs, while Turkey, followed by Vietnam, has the highest livestock population and the highest level of NPS costs (see the following Table).

[14] In order to make comparisons across case study countries feasible, cost data collected in local currency are converted in international dollars using implied Purchasing Power Parities conversion rates (national currency per current international dollar, see glossary).

[15] This analysis is based on a theoretical review of the factors that are likely to influence the level of a country's NPS costs, and a correlation analysis. Data from the case study countries were used in simple correlation between pairs of variables to test for strength of linear association. In cases where a reasonably strong association was observed, a regression line was fitted. However, as a result of the small number of case study countries, relationships that appear to be quite strong in explaining a high percentage of the variation in the dependent variable, can still have considerable sampling errors. The study team has therefore applied all possible caution in interpreting the results, and has only presented those findings that appear to be supported not only by the statistical analysis, but also by a thorough qualitative analysis of facts.

NPS expenditure expressed on a per VLU basis (2007)

	Costa Rica	Kyrgyz-stan	Mongolia	Morocco	Turkey	Uganda	Vietnam	*Average*
NPS costs (000) intl.$	11,172	10,043	21,086	46,811	166,962	16,888[(a)]	67,356	*48,617*
Veterinary Livestock Units (000)	1,365	1,766	6,381	6,455	17,765	8,818	17,483	*8,576*
NPS costs per VLU in intl.$	8.18	5.69	3.30	7.25	9.40	1.92	3.85	*5.66*

Source: Civic Consulting. For sources of data, see country tables in section 3.
Notes: Median values are underlined. NPS costs exclude donor programmes.

⇒ *Substantial differences in the expenditure for the National Prevention System for Animal Diseases and Zoonoses exist between case study countries.* For Turkey, expenditures are with 167 million international dollars roughly 17 times greater than for Kyrgyzstan with 10 million international dollars. Variations in expenditures between case study countries are clearly associated with differences in livestock population. Operational costs of the National Prevention System, when expressed on a per Veterinary Livestock Unit (VLU) basis, therefore give a meaningful comparative measure of the level of service provision in relation to the quantitative requirements.

Economic development and trade

National Income: Gross Domestic Product (GDP) is a general measure of the level of economic activity. There appears to be a close association between this measure of size and the total NPS costs. The straight-line relationship with GDP explains 97 percent of the variation in NPS expenditures in the case study countries.[16]

⇒ *In the case study countries, there is a close relationship between Gross Domestic Product (GDP) and the total expenditures for the National Prevention System.* Differences in GDP explain to a large degree the variation in NPS expenditures. This seems to imply that NPS expenditure is mainly dependent on the country’s ability to pay, rather than on the veterinary requirements.

Per capita income: Per capita income (expressed as Gross National Income or GNI per capita of population), is a commonly used criterion to categorize countries according to their level of economic development. When the countries are ranked in order of increasing GNI *per capita*, the ordering of NPS expenditures per VLU broadly corresponds.

⇒ *Differences in NPS expenditures between countries on a per VLU basis are, at least partly, explained by differences in per capita incomes.* While the overall average NPS cost per Veterinary Livestock Unit for the seven countries amounts to 5.66 international dollars, the average for the three low-income countries, Uganda, Kyrgyzstan and Vietnam, is only 3.82 international dollars. The average for the two lower-middle-income countries, Mongolia and Morocco, is 5.28 international dollars, while that for the upper-middle-income countries, Costa Rica and Turkey, is 8.79 international dollars.

Trade: Costa Rica is the only case study country that earns a substantial income from beef and pig meat exports. This country benefits from FMD free status, without vaccination, and has a high level of NPS expenditure per VLU in comparison with most of the case study countries.

[16] See Figure 4.2 on page 134.

Expenditure on border inspections per VLU is the highest of the countries recording this item. Turkey is a net exporter of poultry meat and eggs, although the quantities represent only a small proportion of the large national output. The value of these exports probably increases the emphasis placed on NPS expenditures. Both Kyrgyzstan and Mongolia are net exporters of livestock products, but of relatively small quantities. Morocco, Vietnam and Uganda are all net importers.

Other factors

Local ecology and animal health situation: Geographical features of the country, such as the climate, topography and location, together with cultural variables, affect the types of livestock kept and the associated production systems. Disease incidence may also be linked with the presence, or absence, of alternative hosts and vectors of disease. These features can determine the relative importance of different livestock diseases, and the choice of appropriate control measures. The total costs of National Prevention Systems are likely to depend upon the relative occurrence of different diseases and the choice of preventive control measures. However, this is not reflected in the data from the case study countries, where the association of NPS expenditures with GDP appears to be more relevant than other factors.

Existence of a private veterinary sector: Some animal health functions, particularly those relating to prevention and control of highly contagious diseases, require public sector intervention. Other functions, such as the control of low-contagion endemic diseases, clinical diagnosis and treatment, are better suited to private provision. Given this differentiation of responsibilities, private sector veterinarians cannot readily substitute for public sector veterinarians in the National Prevention System. Rather the private and public sector veterinarians are likely to complement each other's activities. The contribution of private veterinarians to the improvement of livestock production is not considered to be part of the National Prevention System as defined for this study, and related expenditures of the private sector have been excluded.[17] Due to the lack of data concerning private sector spending on veterinary measures and biosecurity in case study countries, it is not possible to identify effects of private veterinary expenditures on total NPS expenditures. However, it is possible to analyse whether or not the strength of the private veterinary sector, as expressed by the number of private veterinarians has any effects in this respect. Study results indicate that the ratio of numbers of private veterinarians, to numbers of public sector veterinarians in the NPS, tends to increase with increasing national *per capita* income. Judged by the results from the sample of case study countries, the ratio of public to private veterinarians appears to be of little value to explain NPS expenditures.

⇒ *There is no evidence that a stronger private veterinary sector reduces public NPS expenditures in the case study countries.* The relative strength of the private veterinary sector, expressed as the ratio of public to private veterinarians, appears to be related to the income level of the country. In the case study countries, both NPS expenditures and the relative importance of the private veterinary sector increase with a higher GNI *per capita.*

Conflict and civil unrest: Violent civil disputes may lead to an array of adverse effects on the control and prevention of animal disease. Adverse effects may include the difficulty in enforcement of quarantine, linked with military and refugee movement, loss of supply lines for materials, increased smuggling, and problems in getting access to conflict areas, making it difficult to conduct formal disease surveillance and treatment. Few of these problems were reported from the case study countries, although movement of refugees, cross-border migration

[17] However, public expenditures for services of accredited private veterinarians undertaking public service missions are included in NPS costs.

for economic reasons, and informal trade in live animals are relevant issues in some cases. It is likely that where associated disease control problems arise, they limit the effective performance, and therefore raise the costs, of National Prevention Systems. However, no quantitative evidence in this respect was available from the case study countries.

Allocation of NPS expenditures between central and sub-national level

Operating expenditures associated with the National Prevention System are incurred either centrally, in or near the main centre of government, or dispersed more widely in provincial, regional or district locations. Organisations at or near the main centre of government include the national Veterinary Authority, the veterinary border inspection agency (or unit) and the central veterinary diagnostic laboratory. De-centralised or sub-national units generally include provincial, district and/or municipal veterinary units and laboratories.

If only the degree of decentralisation of public services is considered, i.e. NPS expenditures at different levels of government, the following picture emerges: In most case study countries the centralised expenditure per VLU is consistently between one and two international dollars. The exception is Costa Rica where the cost is much higher at 6.18 international dollars. Expenditure per VLU at provincial, district or municipal level is more variable, ranging from 0.45 international dollars in Uganda to 7.52 international dollars in Turkey. There is similar variation in the centralised expenditure expressed as a percentage of the total NPS expenditure. Although the average is 43 percent, values range from a low, of 20 percent in Turkey, to a high level of 77 percent in Uganda.

⇒ *Sub-national expenditures tend to increase relative to the centralised expenditures with increasing size of the national territory.* A high central expenditure in Costa Rica is clearly associated with a centralised structure in a relatively small country, whereas Turkey, Morocco and Vietnam, three of the largest countries in area, spent about three quarters of the total NPS operating expenditure at the sub-national level. However, there are exceptions to the rule: Mongolia, the largest of all the case study countries, has a higher degree of centralised expenditure. Livestock population density is sparse and less funding is distributed to decentralised agencies. Provided that both central and regional elements are included, the average total cost per VLU may be unaffected by the extent of decentralised expenditure.

Allocation of NPS expenditures to different types of expenditure

Staff costs: Staff expenditures per VLU appear to vary with level of *per capita* income. The lowest level applies in Uganda, a low-income country, while substantially higher levels apply in the two upper-middle-income countries, Costa Rica and Turkey. Only Mongolia, with a lower expense than might be expected for its income level, does not follow the trend, partly due to the fact that at district level the local Veterinary Services are run by private Veterinary Service units and related public expenses are a service expenditure and therefore not included in staff costs. Staff expenditures, expressed as a percentage of the total NPS operating expenditure, vary from 19 % in Mongolia to 73 % in Costa Rica and 74% in Turkey.

Material supplies: In all countries, except Turkey, the largest component of the total public non-staff operating expenditure for the NPS is the provision of the necessary supply of materials. These include the costs of items such as vaccines, veterinary drugs, office stationery, and fuel for vehicles. The costs of vaccines are significant in most case study countries, accounting for 20% to 54% of the total NPS expenditure (the exception being Costa Rica, where vaccines are purchased privately by livestock owners and are therefore not a relevant cost factor for the public Veterinary Services).

Services: Expenditure on services includes fees for accredited private veterinarians who undertake public service missions and, if subcontracted, laboratory diagnostics, communications and training of employees. Hire of services accounts for a relatively small proportion of total NPS operating expenditure, a negligible amount in Costa Rica and Kyrgyzstan. Amounts spent on services are all below one international dollar and range from 0.08 international dollars in Uganda to 0.96 international dollars in Morocco.

Consumption of fixed capital: This category of operational costs relates to the annual reduction in the value of fixed assets, or depreciation, of buildings and equipment. Costs of capital depreciation are generally quite low, at a fraction of an international dollar per VLU.

Compensation of livestock holders for animals culled for disease control purposes: Compensation of livestock holders for animals culled for disease control purposes in Mongolia is low at only 0.02 international dollars per VLU and accounts for less than one percent of the total operating expenditure. In Morocco the expenditure is intermediate, at 0.23 international dollars and accounts for three percent of the total operating expenditure. The highest expenditure on livestock owner compensation was reported from Turkey, where it amounts to 0.74 international dollars and eight percent of the total operating expenditure. Levels of expenditure on producer compensation for compulsorily culled animals are therefore absent or very low in most of the seven countries. However, the larger than average amounts spent for compensation of farmers in Morocco and especially in Turkey could be one of the factors contributing to higher than average NPS costs in these countries.

⇒ *Spending patterns for different categories of expenditures vary across case study countries, however, this provides little explanation for differences in overall NPS expenditures.* Levels of staff costs and expenditures such as travel costs appear to be directly related to levels of *per capita* income of case study countries. Considerable differences in spending that depend on other factors are related to three categories: Fees for private veterinarians conducting public service mission (up to 0.96 international dollar/VLU), expenditures for vaccines (up to 1.57 international dollar/VLU), and compensation of livestock holders (up to 0.74 international dollar/VLU). In some other countries, spending for these items is zero or close to zero.

II. Economic indicators linked to Veterinary Services for use within the PVS Tool

Economic indicators linked to Veterinary Services can either relate to the total NPS operating expenditure, or to the various functional cost components of this expenditure, such as those of staffing requirements, vaccine provision, veterinary laboratory services and equipment. An additional aim is therefore to identify indicators of the level of provision of these specific components.

In the search for suitable economic indicators to be integrated into PVS Evaluations, information was gathered not only from the detailed country case study investigations, PVS Evaluation reports and literature review, but also from online resources. Economic data were derived mainly from the World Bank, and International Monetary Fund databases, livestock data from the FAO agricultural databases and veterinary data from the OIE animal health database. The methodology adopted was to seek for relationships between NPS expenditures and other variables, relating to the geographical, economic livestock production and veterinary characteristics of each country.

Relationships may be established on logical grounds, such as that between NPS expenditures and scale of veterinary requirements, as measured by the total VLU numbers. Hypothesised relationships between variables may be tested by means of scatter-plots, and their strength measured by statistical correlation or regression analysis. These statistical approaches allow an assessment of goodness of fit, measured by the proportion of variation in the dependent variable attributable to the relationship. If the fit is poor, it suggests there is little or no relationship and it is unlikely to provide a useful indicator. All these methods were used, in the course of the study visits and subsequently in analysis of the results. For this study, a large set of potential indicators was scrutinised, many of which proved to be of limited value. In this report, only those selected indicators that appear to have value as economic indicators linked to Veterinary Services are discussed.

Indicators for total NPS expenditure

The total public expenditure for the National Preventions System (not including donor contributions), when related to livestock population (expressed in Veterinary Livestock Units) or national income (GDP), serves as a key indicator used throughout much of this study.

Overview of possible indicators concerning costs of the NPS as a whole

Description	Indicator	Comments
Indicators for the costs of the NPS as a whole		
Indicator of the level of NPS provision in relation to veterinary care requirements	Total public operating expenditures for the NPS / VLU	*Data collection for providing measurement of total NPS expenditures in a given country requires separate visit of a specialist team.*
Indicator of the level of NPS provision in relation to national income	Total public operating expenditures for the NPS / GDP	

Source: Civic Consulting.

Measuring or estimating total NPS expenditure

Data on National Prevention System expenditures in the case study countries are not readily available from official records and accounts. There appears to be no easy alternative to the method of direct recording of expenditures through country visits of an experienced expert team (not unlike the approach chosen for the PVS Evaluation) for providing *precise measurements* of NPS expenditures. However, the results of the study point to a possibility of *estimating* NPS expenditures with easily available data. With the measures of NPS expenditures for the case study countries, together with published estimates of GDP, an apparently strong linear association has been identified between the two variables. This finding is important since it seems to demonstrate that levels of NPS expenditure are largely determined by national income levels or ability to pay. The relationship with GDP explains 97 percent of the variation in NPS expenditures between countries (see section 4.2.2.1). The regression equation is:

$$y = 0.1756x + 15.19$$

Where *y = NPS expenditure in millions of international dollars; and*
x = GDP in billions of international dollars.

This implies that there is a fixed cost of 15.19 million international dollars incurred regardless of the level of GDP. In addition, for each additional billion international dollar increase in GDP there is a corresponding increase in NPS expenditure of 175.6 thousand international dollars.

⇒ *The strong linear correlation between GDP and NPS expenditures for the case study countries can be used to estimate current National Prevention System expenditure.* However, this approach provides a rough estimation of the likely <u>current level</u> of funding of the NPS only, and does <u>not in any case determine the optimal level of NPS expenditures</u> in a given country. The only reliable and accurate method of obtaining data on NPS expenditures in other countries currently available is by means of direct measurement, using the methodology developed for this study.

Limitations of using total NPS expenditures as benchmark

The basis for the formula for estimating NPS expenditures presented above is a statistical correlation and regression analysis of the data obtained through the country studies. The resulting findings have to be interpreted with care, because of limitations regarding the size of the sample and the way it was constructed (see section 6.2.3.1 of this report). In addition to these limitations, study results raise general questions concerning the possibility of using data on total NPS expenditures as benchmarks for other countries. Because of the large social, economic, geographical and livestock population differences between countries, it is doubtful whether uniform benchmark values for total NPS expenditures per VLU are likely to be *globally* applicable, e.g. concerning the expenditures for a NPS largely aligned with OIE International Standards. Initial results from Uruguay and Romania, which have higher PVS levels than the other case study countries, appear to hint to widely varying NPS expenditures per VLU, although unfortunately data limitations do not allow for a final conclusion in this respect.

⇒ *A 'gold standard' or quality benchmark figures are needed for comparison of NPS expenditures between countries, but assessments may be more effective if focused on key elements rather than on the total NPS expenditure at national level.* The results of this study suggest a gradual approach to derive benchmark values that provide guidance to countries for allocating their NPS expenditures effectively and efficiently, focusing on key elements of the National Prevention System (such as cost of surveillance, border inspection, diagnostic laboratory facilities); and collecting regional benchmark cost data.

Indicators for degree of compliance with OIE International Standards

The development of the OIE-PVS Tool is the product of a comprehensive and detailed analysis and review of the requirements of effective Veterinary Services, and appears to be a very valuable tool for economic analysis, as it provides an assessment, albeit qualitative, of the level of performance (degree of compliance with OIE International Standards on Quality of Veterinary Services). An aggregated PVS measure would be very helpful as it would allow comparison of NPS expenditures with the degree to which the National Prevention System adheres to OIE International Standards. For example, the relationship between PVS results and NPS expenditures could be of interest as a benchmark for performance, if results from a sufficient number of comparable countries were available. NPS expenditures that are much higher per VLU than in other countries reaching similar PVS scores would justify further analysis, either to identify possible inefficiencies, or to identify factors that explain the additional expenditure. Similarly, NPS expenditures that are much lower per VLU than in other countries reaching similar PVS scores would either be interesting study objects concerning best practices, or could provide more insights in (country-specific) factors reducing NPS expenditures.

Constructing an average score for PVS Evaluations, however, raises methodological concerns, because critical competencies relate to a variety of different issues, and the use of averages allocates the same weight to very different critical competencies. This could lead to distortions, because some aspects of the NPS may be more relevant for the overall compliance with OIE standards than others. A possible solution would be to develop a weighting scheme that would assign weights reflecting the relative importance given to the different critical competencies. Alternatively, it would be possible to refine and regroup all critical competencies of the PVS Tool that are related to a specific key component of the NPS (e.g. veterinary diagnostic laboratories), and combine the levels of advancement reached for these competencies, which could then directly be related to the expenditures for these key elements.

Overview of possible indicators concerning compliance with OIE Standards

Description	Indicator	Comments
Possible indicators linked to Veterinary Services in compliance with OIE International Standards on Quality of Veterinary Services		
Quantitative expression of overall PVS results	Overall PVS result compared to total public operating expenditures for the NPS / VLU	*Currently not available. In future refinements of the PVS Tool, consideration could be given to a more quantitative approach, and group critical competencies to allow a more direct correlation of PVS results and costs for key elements of the NPS.*
Quantitative expression of PVS results for key NPS elements such as veterinary diagnostic laboratories	PVS result for key NPS elements compared to public operating expenditures for the key element / VLU	

Source: Civic Consulting.

⇒ *A quantitative expression of OIE-PVS Evaluation results would be helpful for assessing the degree of compliance with OIE International Standards on Quality of Veterinary Services in a systemic perspective.* In future refinements of the PVS Tool, the introduction of a more quantitative approach could be considered. Also, due to the cross-cutting character of several of the critical competencies used for the PVS Tool, it is currently difficult to correlate the costs for key NPS elements (e.g. veterinary diagnostic laboratories) to the results of a sub-set of PVS critical competencies related to this NPS element. It could therefore also be considered to refine and group critical competencies to allow a more direct correlation of PVS results and costs for key elements of the NPS.

Indicators for specific NPS expenditures, material infrastructure and donor support

A set of indicators for specific NPS expenditures, material infrastructure and donor support can be defined as a basis for further analysis (see Table below). These indicators are mainly of interest when analysing how specific NPS features compare with other countries.

Overview of possible indicators concerning specific NPS components

Description	Indicator	Comments
Indicators for specific NPS expenditures		
Indicator for NPS staff relative to requirements	VLU / Public professional staff of the NPS	*Key indicator, which requires new reporting format for OIE members*
Indicator for staff costs	Public staff costs of the NPS / VLU	*Possible to assess with a relatively limited effort during PVS Evaluation visit. The sum of these three categories of expenditure accounts for more than 60% of total NPS expenditures in all seven case study countries, and provides therefore insight into main cost factors relevant for the NPS.*
Indicator for public procurement of vaccines	Public expenditures for vaccines / VLU	
Indicator for relevance of accredited private veterinarians undertaking public service missions	Public expenditures for accredited private veterinarians / VLU	
Indicator for veterinary laboratories	Public expenditures for veterinary diagnostic laboratories / VLU	*More difficult to measure in practice, data on depreciation of laboratory equipment rarely available. Further research on benchmark cost data needed.*

Specific indicators for material infrastructure of the NPS		
Vehicle index	Number of vehicles / public NPS veterinarian	*Of interest when identifying needs and calculating estimates of investment costs to upgrade the material infrastructure, based on easily available standard cost data.*
ICT index	Number of ICT items / public NPS veterinarian	
Other indicators		
Dependence on donor funding	Donor funding / total public operating expenditures for the NPS	*To assess the level of dependence on outside funding.*

Source: Civic Consulting.

Data on expenditures concerning these and other indicators can be collected during the OIE-PVS Evaluation or the PVS Gap Analysis,[18] as well as through focused study visits of a specialist expert team or – to a more limited extent – through local correspondents. In the medium to long term a database of regional benchmark cost data for key elements of the NPS could be gathered. Relevant experiences from the public health field could be worth evaluating in-depth, both in terms of data collection procedures and the use of data.

⇒ *Consideration could be given to the development of a database of benchmark cost data concerning specific components of NPS expenditures.* The necessary data could be obtained during the PVS Evaluation or PVS Gap Analysis visit or, alternatively, through a visit of a specialist expert team. Benchmark cost data concerning key elements of the NPS would create a better basis for the design and budgeting of desired improvements in the NPS provisions in developing and transition countries, creating both a better basis for the budgeting process of specific countries and more transparency for donors.

Possibilities to improve base data collection

Livestock and VLU data: As has been indicated before, this study confirms that the best available indicators for comparative assessments of National Prevention Systems are defined on a per Veterinary Livestock Unit (VLU) basis. Measures of Veterinary Livestock Units are calculated from estimates of livestock populations by species and using conversion coefficients for different species. A more consistent use of VLU would be supported significantly by a coordinated effort to improve reliability and scope of the data on livestock populations provided at international level. Currently, livestock data from available sources such as FAOSTAT and the OIE WAHID database can differ significantly, and this can potentially distort the analysis. In addition, there appears to be some scope for improving the reliability of VLU conversion coefficients by redefining them, e.g. by including more species and possibly differentiating conversion coefficients according to production system for some species. The latter aspect would, however, depend on the possibility of making available global livestock data in this respect, which appears to be a challenge in itself. A redefined VLU would therefore necessarily be a compromise between the aim to represent a valid measurement of veterinary requirements and the need to allow its application in practice.

Veterinary personnel data: Currently, the only data source available concerning veterinary personnel is the data reported to the OIE from member countries. However, the analysis in the case study countries made clear that reporting is not always accurate, and the reporting format

[18] Currently, the OIE-PVS Evaluation is complemented in selected countries by a PVS Gap Analysis. A PVS Gap Analysis is intended as a basis for budgeting to strengthen the Veterinary Services and builds upon the results of the PVS Evaluation. It describes main activities to fill the current gaps identified in the PVS Evaluation and also considers organisational issues related to implementing a so-called ‘5-years conformity strengthening plan’.

does not allow differentiation between public veterinarians of the Veterinary Services working on prevention, surveillance and control and other public veterinarians working e.g. on livestock production issues (such as genetic improvement of livestock). In addition, in several of the case study countries the central public Veterinary Service is not aware of the number of veterinary personnel working at the sub-national level, and this again is problematic both in terms of comparability of data from different countries, and also from a disease management perspective. It appears to be reasonable that a precondition for improving a National Prevention System at any level of expenditure would require that the central Veterinary Service has reliable information on the staff resources available at sub-national level e.g. for emergency measures. It is therefore recommendable that governments develop a database of staff numbers of the public Veterinary Services across all levels of government. This could be encouraged by revising the reporting format for the annual OIE World Animal Health Report. A new reporting format could provide the following categories (see also the indicative template, Table 6.2 on page 185):

- Differentiate between *public and private* veterinary personnel;
- Differentiate the *categories* of veterinary personnel paid from the public budget (veterinarians, other university graduates and veterinary paraprofessionals/ technicians in the public Veterinary Services as well as accredited private veterinarians/paraprofessionals paid for public service missions);
- Differentiate the *type of activity* of the personnel (animal health, public health, veterinary diagnostic laboratories, animal production, veterinary research and education, other).

Although collection of such data would require additional efforts by member governments, this would hugely improve the basis for any future economic assessment of the National Prevention System, as staff costs account for up to three quarters of NPS operating expenditures in the case study countries.

Animal health situation: Assessments of the cost-effectiveness of specific animal disease control measures, such as brucellosis vaccination programmes, are often measured against an indicator, such as changes in disease prevalence as identified through active surveillance programmes or changes in the number of reported brucellosis cases per year. At a systemic level a quantitative indicator for the animal health situation in a specific country is, however, not available. In this study, the total number of animal disease outbreaks reported to the OIE was used as a very crude indicator for the overall animal health situation, but this indicator is of very limited use. In comparison, in the public health field several systemic indicators for the health of the population are available, such as the expected lifetime at birth. In the medium to long term it appears to be indispensable for any economic consideration of animal health measures to have better systemic indicators available that reflect the animal health situation of the livestock population in a given country.

⇒ *The use of economic indicators within the PVS Tool, and economic analysis of National Prevention Systems for Animal Diseases and Zoonoses in general, could be significantly furthered by improving the reliability of global base data.* The country studies conducted for this study have documented a large variety of data availability issues concerning base data such as livestock numbers and veterinary personnel. This can potentially distort the analysis. A coordinated effort to improve reliability and scope of the base data on livestock populations and other relevant topics appears to be necessary at international level.

1. Introduction

Background

The World Organisation for Animal Health (OIE) has commissioned Civic Consulting to conduct a study on the Cost of National Prevention Systems for Animal Diseases and Zoonoses in developing and transition countries in compliance with OIE International Standards on Quality of Veterinary Services (VS), allowing early detection and rapid response to emerging and re-emerging diseases.

In October 2007, the results of three economic studies on the prevention and control of animal diseases worldwide[19] were presented at the International Conference on “Global Animal Health Initiative: the Way Forward”, co-organised by the World Bank (WB) and the World Organisation for Animal Health (OIE) in collaboration with the Food and Agriculture Organization (FAO) of the United Nations. With regards to the first study on the “Financing of Animal Epizootics and Zoonoses Prevention and Losses in Developing/Transition Countries – Cost-Benefit Analysis – Prevention versus Outbreak Costs”, the Conference concluded, among others, that the cost of preventing animal diseases are significantly less than those associated with managing outbreaks, that the current state of Veterinary Services and preparedness levels in developing/transition countries continues to pose a real threat to the ability of preventing and controlling these major diseases, and that the capacity of Veterinary Services to collect and analyse data to conduct cost-benefit analyses should be added to the competencies evaluated in the OIE-PVS Tool.

Recognising the need for a global approach and a predominant role of Veterinary Services in the fight against animal diseases, the conference acknowledged the necessity to conduct this complementary study, which will further elaborate on the cost of prevention and surveillance and develop economic indicators within the PVS Tool.[20]

Structure of the study

The structure of this report is as follows: <u>Section 2</u> describes objectives and scope of the study and details the methodological framework developed for its implementation. <u>Section 3</u> presents the data and results from the country case studies. <u>Section 4</u> provides a synthesis of the case study results. It presents key data of the case study countries, a review of possible reasons for differences between the case study countries in the total costs of the National Prevention System and an analysis of specific expenditures related to the NPS in the case study countries. <u>Section 5</u> discusses economic indicators closely linked to Veterinary Services in general, economic indicators linked to Veterinary Services in compliance with OIE International Standards on Quality of Veterinary Services and the possible inclusion of economic indicators into the OIE-PVS Tool. <u>Section 6</u> summarises the main results from the case studies concerning the costs of National Prevention Systems for Animal Diseases and Zoonoses, analyses the possibilities to apply the results of the case studies to other countries, and discusses possible future approaches for integrating economic indicators into PVS Evaluations.

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[19] Conducted by a Consortium of Civic Consulting (lead) and Agra CEAS Consulting.

[20] The above-mentioned first study on the “Financing of Animal Epizootics and Zoonoses Prevention and Losses in Developing/Transition Countries – Cost-Benefit Analysis – Prevention versus Outbreak Costs” mainly focused on the particular case of HPAI. It was therefore decided to examine in a follow-up study the costs of National Prevention Systems for Animal Diseases and Zoonoses in more detail without limiting the analysis to specific diseases.

Acknowledgements

This analysis would not have been possible without the support from many sides, including from the Veterinary Authorities of the nine countries that were subject to in-depth research concerning the costs of their National Prevention System: Costa Rica, Kyrgyzstan, Mongolia, Morocco, Romania, Turkey, Uganda, Uruguay, and Vietnam.[21] We are particularly grateful for the time and efforts they and other institutions in the case study countries dedicated to this study to provide detailed information on the organisation of their Veterinary Services and budgets. We would also like to express our gratitude to other interview partners, including at the World Bank and the Food and Agriculture Organization of the United Nations (FAO), who provided their thoughts and support. We would like to thank the peer reviewers who made very helpful comments on the draft report and suggested changes that have greatly supported the finalisation of this study.[22] The peer review was conducted by a total of twelve experts from the Bill & Melinda Gates Foundation (Global Development), the European Commission (EC), *l'Institut français des relations internationales* (IFRI), a group of animal health experts within the World Bank (WB), and additional international experts familiar with OIE Standards and the OIE-PVS Tool. Finally, we would also like to thank the Coordinator of the OIE World Animal Health and Welfare Fund for the support and guidance provided throughout the study.

[21] We also thank the Veterinary Authorities of Algeria, Panama, Swaziland, and Yemen, which declared their willingness to cooperate for this project, but could not be selected for in-depth research.

[22] Participants in the peer-review process were asked to provide their expert opinion, without necessarily expressing the views of their organisation.

2. Methodological framework

2.1. Objectives and scope of the study

This study has two main objectives:

1. To estimate the costs of National Prevention Systems for Animal Diseases and Zoonoses (NPS) in compliance with OIE International Standards on Quality of Veterinary Services, allowing permanent early detection and rapid response to emerging and re-emerging diseases in different regions, economies, animal health systems and eco-systems; and

2. To identify economic indicators closely linked to Veterinary Services in compliance with OIE International Standards on Quality of Veterinary Services which may be later used to further complete and improve the OIE-PVS Tool,[23] particularly in the field of the follow-up on the cost of permanent national surveillance, early detection and rapid response mechanism.

Both objectives are interrelated: To identify relevant economic indicators (objective 2), it is first required to collect data concerning the costs of existing National Prevention Systems (objective 1), and to explore in the process of data collection and analysis the feasibility and relevance of selected indicators.

Main requirements of the Terms of Reference (TOR) of the study, refined in a subsequent dialogue with the OIE, are as follows:

- The study will estimate the cost of National Prevention Systems in "peace time" focusing on the cost of surveillance and prevention of animal diseases (including zoonoses) as opposed to the cost of sanitary crisis due to non-prevented major animal disease outbreaks. Relevant are expenditures for prevention and control of OIE listed diseases and the ability to detect and report new and emerging epidemiological events;

- The study will be based on country case studies in the five OIE regions allowing estimates of expenditures of operational Veterinary Services in compliance with OIE International Standards on Quality of Veterinary Services, focusing on the actual situation in different regions, economies, animal health systems and eco-systems, to catch worldwide representativeness;

- The study will focus on public sector expenditures in the baseline year 2007, including costs for services of accredited private veterinarians undertaking public service missions;[24]

- The study does not aim at providing a cost-benefit analysis or cost-effectiveness analysis of animal disease prevention. It focuses exclusively on the cost side;

[23] The OIE-PVS Tool is designed to assist VS to establish their current level of performance, to identify gaps and weaknesses regarding their ability to comply with OIE international standards, to form a shared vision with stakeholders (including the private sector) and to establish priorities and carry out strategic initiatives, see OIE-PVS Tool 2008.

[24] There are several reasons for this limitation: In the prevention and control of diseases notifiable to the OIE the public Veterinary Services have a crucial role, which is especially true in most developing and transition economies. Also, the study is mainly intended for the use of OIE member governments to provide a basis of comparison and benchmarks in a public service perspective. Because the number of private veterinarians providing curative care varies significantly between countries, the ratio of public service veterinarians to private sector veterinarians will be considered as an important external factor to be taken into account.

- The study focuses on the National Prevention System for Animal Diseases and Zoonoses concerning terrestrial animals. It does not cover aquatic animals and related prevention measures.[25]

2.2. Methodological approach and key issues considered

In line with the objectives described in the previous section the main emphasis of the study is on the estimation of costs of selected National Prevention Systems for Animal Diseases and Zoonoses and a subsequent analysis of the data. This analysis includes a comparison of countries, the assessment of possible indicators and also explores how the results from the country analyses can serve as benchmarks for the public costs, for surveillance, early detection and rapid response (including services of accredited private veterinarians undertaking public service missions) at the national level in other countries than the case study countries.

A major challenge for the study has been the absence of other, comparable studies in the animal health field. Previous studies mainly focused on specific regions, e.g. in Africa, or applied a much narrower definition of "epidemiological surveillance systems" than the definition of National Prevention System used in this study, or focused on measures related to specific diseases rather than considering the overall system (see section 2.4.1 below). A major element of the study has therefore been developing, testing and refining the methodological framework presented in this and the following section.[26]

In brief, the approach followed by this study was as follows:

1. *Definition of the boundary of the National Prevention System* – A definition of the National Prevention System and its boundary was developed that includes all public sector capacities for surveillance, early detection and rapid response (including services of accredited private veterinarians undertaking public service missions) and is also practicable for the cost assessment.
2. *Identification of main functional units of the National Prevention System* – Main functional units of the NPS at central and sub-national level were defined, to allow comparing key cost centres of the National Prevention System across case study countries.
3. *Development of an approach for cost assessment* – The methodology for the cost assessment was developed taking into account best practices from the animal health and public health fields. Uniform approaches were developed for the use of budget data, the extrapolation of data, where required, and the calculation of depreciation (consumption of fixed capital) based on an inventory of NPS infrastructure, where applicable.
4. *Data collection* – Data were collected in a first stage through a review of literature and databases, a questionnaire survey of 13 candidate countries and exploratory interviews with the public Veterinary Services (often involving the CVO or the head of animal health department) conducted by phone. In a second stage, country visits of the core expert team to eight countries took place.[27] Final data sets were obtained for a total of

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25 The reason for this limitation is that the OIE-PVS Evaluation of Performance of Veterinary Services, which is used as a basis for the country studies, currently focuses on terrestrial animals, and aquatic animals were hardly relevant for some of the case study countries (e.g. Mongolia).

26 Valuable support for the development of the methodology of this study was provided by Andrew Tessler, Oxford Economics, and Prof Steffen Fleßa, Greifswald University.

27 See Annex 6 for a description of the methodological approach for data collection on NPS costs in case study countries.

seven countries. These are **Costa Rica, Kyrgyzstan, Mongolia, Morocco, Turkey, Uganda,** and **Vietnam**. In addition, partly incomplete data sets were obtained for Uruguay and Romania.[28]

5. *Calculation of the costs of the National Prevention System* – The data collected and processed for each functional unit of the National Prevention System were used to calculate the public expenditures related to the NPS for each case study country.
6. *Comparative analysis of the costs of the National Prevention System in case study countries and analysis of factors that influence these costs* – Operating expenditures for the NPS as a whole and for main functional units for all case study countries were comparatively analysed, as well as different indicators/ratios (e.g. of NPS expenditure/Veterinary Livestock Units[29]) to identify factors that may influence costs.
7. *Identification of economic indicators linked to Veterinary Services to further complete the OIE-PVS Tool and possible approaches for using case study results for other countries* – The feasibility and relevance of different economic indicators that could be used in the framework of PVS Evaluations was assessed. The study also explored the feasibility to use study results as benchmarks for the public costs for surveillance, early detection and rapid response (including services of accredited private veterinarians undertaking public service missions) at the national level in other than the case study countries.

In practice, a number of broad issues needed to be considered, at the outset, when taking this approach. While all of these issues present methodological challenges, it is still possible to provide costs estimates for National Preventions Systems. Accordingly, these issues are outlined below, along with the approaches used to resolve them:

Issue 1: Degree of compliance of Veterinary Services with OIE International Standards on Quality of Veterinary Services varies between countries

Issue

According to the TOR, the country case studies are aimed at providing estimates of expenditures of operational Veterinary Services *in compliance with OIE International Standards on Quality of Veterinary Services*. However, the degree of compliance of Veterinary Services with OIE International Standards on Quality of Veterinary Services varies between countries, and this raises issues concerning a) which level of compliance should be required for the case study countries and b) how the level of compliance should be assessed.

Resolution

Since 2006, the OIE has conducted a total of more than 85 PVS Evaluations of Veterinary Services of OIE member countries. The OIE-PVS Tool is designed to facilitate the identification of areas of improvement to bring national Veterinary Services into compliance

[28] For Romania and Uruguay, comprehensive data collection efforts took place and a substantial amount of data was compiled and analysed. However, data sets were partly incomplete and could not be compared with the seven countries for which a full data set was available.

[29] See section 5.1.1.2 where the concept of Veterinary Livestock Unit (VLU) is discussed in detail, and the glossary on page 9 for a definition.

with the OIE quality standards. For this aim, it establishes the current level of performance of VS by determining the qualitative levels of advancement for a list of critical competencies.[30]

It was therefore decided to focus on those countries for which a PVS Evaluation was available, resolving issue b) above. Concerning the level of compliance (issue a) it was decided *to cover different levels of compliance as expressed in the results of the PVS Evaluation, in line with the aim of the study to cover a wide range of countries and situations.*

Issue 2: Extent of differences concerning economic conditions, animal health systems and eco-systems of potential case study countries

Issue

The Terms of Reference of the study emphasise the need to "catch worldwide representativeness" through country case studies in the five OIE regions to estimate expenditures of operational Veterinary Services, focusing on the actual situation in different regions, economies, animal health systems and eco-systems. With limited resources available, the selection of case study countries posed a significant challenge.

Resolution

Based on criteria provided in the TOR, and a dialogue with the OIE, the countries covered were selected on the basis of the following criteria:

- A representative sample of countries from the five OIE Regions (covering 2 countries in Africa,[31] the Americas, Asia/Oceania, Europe, and 1 country in the Middle East);
- Different administrative structures (federal and non-federal states);
- Different types of livestock production, intensive and extensive animal husbandry systems (e.g. poultry: back-yard to commercial and intensive production; cattle: extensive pastoral and ranching to intensive fattening and dairy production; etc.);
- Different types of ecosystems (e.g. mountainous, desert, etc.);
- Different trading systems (e.g. local markets, overseas exports, close transboundary trade (regional trade), etc.);
- Different animal health status;
- OIE-PVS Evaluations done and released by the government;
- Willingness of the countries to cooperate.

On basis of the criteria a total of 13 "candidate countries"[32] for the case studies covering the five

[30] The OIE-PVS Tool is organised in 4 fundamental components i.e. Human, Physical and Financial Resources; Technical Authority and Capability; Interactions with Stakeholders; Access to Markets. Each of these fundamental components includes six to twelve critical competencies. Each critical competency is associated to one of the 5 levels of advancement; level 1 corresponding to non-compliance and level 5 to the highest level of advancement attainable. A higher level of advancement assumes that the VS are complying with the preceding (non 1) levels (i.e. level 3 assumes compliance with level 2 criteria; level 5 assumes compliance with level 4 and preceding criteria; etc.) (OIE-PVS Tool 2008).

[31] Additive criteria for African countries: One country from the North-African sub-region and one from the Sub-Saharan sub-region; one French speaking country and one English speaking country.

OIE regions[33] were identified, of which after the first stage of research nine were finally selected. Key data concerning the selected countries are presented in the following Table:

Table 2.1: Key data of case study countries

	Costa Rica	**Kyrgyz-stan**	**Mongolia**	**Morocco**	**Romania**	**Turkey**	**Uganda**	**Uruguay**	**Vietnam**
OIE-Region	*The Americas*	*Europe & Central Asia*	*Asia*	*Africa*	*Europe*	*Europe & Middle East*	*Africa*	*The Americas*	*Asia*
GDP (PPP) million intl. $	46,021	10,508	8,426	126,943	245,847	885,905	32,767	37,357	221,614
Land area (000) km^2	51	200	1,567	447	238	784	241	176	329
Population (000)	4,398	5,258	2,604	30,852	21,531	73,921	29,898	3,331	86,205
Vet.Livestock Units (000)	1,365	1,766	6,381	6,455	6,491	17,765	8,818	13,571	17,483

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: For Romania and Uruguay incomplete data sets were obtained.

A notable observation concerning the sample of countries is the absence of very large countries with large public Veterinary Services, notably China and India. These countries were not considered, because of the absence of a PVS Evaluation, and because of the complexity of the veterinary system, which would make it extremely difficult to come to credible estimates. In addition, results would be difficult to interpret considering the huge differences between the animal health status and animal production systems of different parts of the country. The results of this study are expected to be, however, also of use for very large countries, in as much as specific states or provinces within the country can be compared in their characteristics to the case study countries.

Issue 3: Differences in scope and structure of public VS in different countries

Issue

The institutional structure of the public Veterinary Services differs considerably between case study countries, as does the scope of tasks performed by the relevant organisations. For example, some VS have an overall responsibility for food safety related to products of animal origin (including inspection of dairy producers and sometimes even restaurants), whereas in other countries all food inspections are conducted by other services. This leads to difficulties when comparing costs between countries.

32 The candidate countries were Algeria, Costa Rica, Kyrgyzstan, Mongolia, Morocco, Panama, Romania, Swaziland, Turkey, Uganda, Uruguay, Vietnam, Yemen. This sample unavoidably involves some degree of sample bias, particularly due to the fact that it is limited to countries for which an OIE-PVS Evaluation was completed in 2007 and to countries that were willing to cooperate. These necessary criteria may have inevitably reduced, to a limited extent, the representativeness of the sample (see discussion of study limitation in section 6.2.3.1).

33 Africa, Middle East, Europe, Asia, the Americas.

Resolution

In a first step, a practical and consistent definition and boundary of the National Prevention System was developed on the basis of a literature research, expert interviews and a pilot country study. The resulting definition of the NPS is as follows:

> *The National Prevention System (NPS) is understood to include all services and activities of the public Veterinary Services, and other relevant public providers[34] at national and sub-national level, allowing early detection and rapid response to emerging and re-emerging animal diseases, including the services of accredited private veterinarians undertaking public service missions financed from the public budget.*

According to this definition, most core functions of the public VS are considered to be part of the NPS. This includes epidemiological surveillance, public disease prevention measures (such as vaccination programmes), veterinary laboratory diagnosis, border inspection and inspection of live animal markets, as well as public veterinary inspections in slaughterhouses (the latter because of the related disease surveillance function). Included are also publicly financed services of accredited private veterinarians. Excluded are, however, veterinary research and education (e.g. universities), animal welfare issues, animal production issues and food safety inspections other than in slaughterhouses.

Concerning disease control measures, the NPS border was drawn as follows:

- <u>Included</u> in the NPS are public control measures applied in the event of a limited outbreak (such as compulsory slaughter, movement standstills, and ring or prophylactic vaccination, and compensation of owners of culled livestock in limited outbreaks). Related costs are considered to be part of the costs of a National Prevention System as long as this does not involve emergency resources (e.g. ad-hoc culling teams) or extra-budgetary contingency funding characteristic for sanitary crises;
- <u>Excluded</u> from the NPS are control measures related to sanitary crises (such as catastrophic outbreaks of animal diseases). In a pragmatic definition, excluded from the costs of the National Prevention System are those measures related to major outbreaks that are financed through contingency funding by the government and involve outside resources (e.g. ad-hoc culling teams and extra budgetary means for compensatory funding, etc.).

All public institutions contributing to the NPS functions are considered in the cost assessment according to main functional units that are uniform across countries:[35]

- <u>Functional units at central level</u> are central or federal public Veterinary Services (including veterinary inspection of live animal markets and slaughterhouses conducted at central level), the national veterinary laboratory, border inspection;
- <u>Functional units at sub-national level</u> are regional and local level public Veterinary Services (including veterinary inspection of live animal markets and slaughterhouses conducted at sub-national level), regional and local veterinary laboratories, veterinary units of municipalities.

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[34] Providers are defined as institutions undertaking activities inside the NPS boundary.

[35] Expenditures related to the costs of maintaining interactions and links with stakeholders and the costs of central functions (e.g. coordination, communication, preparation of legislation, official representation, etc.) are also considered in the cost assessment (see section 2.3.3, which defines the functions that are directly relevant for the NPS).

Services of accredited private veterinarians are financed from the budget of the relevant functional unit of the public Veterinary Services for which they undertake public service missions and are therefore considered as a services expenditure of this unit.

The definition of these main functional units allows for comparing key cost centres of the National Prevention System across case study countries. A detailed definition of the boundary of the NPS and the main functional units considered is presented in section 2.3.3 below.

Issue 4: Limited availability of budget and other cost data in general

Issue

Exploratory research indicated the difficulty to obtain budget data from the case study countries that would allow conducting the cost assessment related to the NPS. Problems encountered included the following:

- Budget data were only available concerning non-staff operational costs, as salaries were paid from a different budget line of the Ministry;
- Budget data were available, but only for the overall organisation or a major unit (e.g. a department of a Ministry), and not for those particular units relevant for the NPS;
- Budget data were not available at all for some organisations.

Resolution

In principle, either a "top down" or a "bottom up" approach could be used for this study. The *top down approach* is based on the available budget data of the main providers, as reported by the central government. It follows the delineations and reporting criteria of the national budget, and allows, at the aggregated level, to check whether the baseline year corresponds to a typical year, or if extraordinary events that may distort the picture occurred. In contrast, the *bottom up approach* relies only to a limited extent on budget data and total cost measures are derived from basic input data concerning fixed and variable costs (e.g. buildings used, number of staff members and average staff costs). This approach can be used in limited costing exercises or for mono-functional analyses, but has significant disadvantages for larger systems such as the National Prevention System. These disadvantages include, for example, the difficulty to reflect complex civil service payment systems and the need to collect large inventories of equipment. For this study, it was decided to use a *mixed approach*, which most adequately reflected the differences in terms of data availability in the case study countries. The mixed approach consists of a top down approach where budget data for relevant organisations were obtained, which is supplemented by a bottom up approach for specific aspects where no budget data are available.

A specific issue that had to be considered for the analysis of the data obtained was the (typical) situation that a specific department of a relevant institution is considered as one single unit in the organisation's budget, but provides both functions that are inside the boundary of the National Prevention System and other functions that are outside the boundary of the National Prevention System. To allow in these cases for the exclusion of costs, which are outside the scope of the NPS, the number of professional staff[36] assigned to the different functions of the department was used as a proxy for the relative distribution of costs. For example, if 30% of the staff members of a department are employed in the area of livestock production, and 70% in

[36] Numbers of professional staff include veterinarians, non-veterinary graduate personnel, as well as veterinary paraprofessionals (including trained Community Animal Health Workers, livestock inspectors, veterinary technicians, and, in the case of veterinary laboratories, laboratory technicians). Not included is support staff.

livestock disease surveillance programmes, then 30% of total costs of this department were excluded.[37] Administrative costs related to human resource management and financial management of the host organisation (e.g. the Ministry of Agriculture), which are shared with other departments/units that provide functions outside of the boundary of the National Prevention System, were not considered.

Because of the complexity of this approach it was decided to focus on the total actual costs of the relevant institutions of the National Prevention System for the baseline year 2007 only. To assess possible distorting influences of extraordinary circumstances in the baseline year, the case studies also explored whether this year could be considered a typical year or not in terms of operational expenditures.

Issue 5: Limited budget data concerning the sub-national level available

Issue

The sub-national level of the public Veterinary Services is a crucial element of an NPS, as disease prevention and surveillance takes place "in the field" and these activities often involve public veterinarians to a significant degree. However, budget data concerning sub-national units is not always available at the central or federal level.

Resolution

This problem was one of the main challenges of the study, as the sub-national level may account for a significant proportion of NPS costs. To address this challenge, the following approach was chosen:

In some countries sub-national VS activities are financed from the central budget, as is the case in Turkey (where regional administrations for agriculture are part of the line ministry), and in Kyrgyzstan, Costa Rica, Morocco and Uruguay where the central VS administers the sub-national budget, or sub-national units are fully integrated into the central VS. In these cases the central budget data were used, and costs were allocated to sub-national NPS functions in line with the approach described above, i.e. by considering a) detailed budget data, where available, and b) allocating the budget according to the number of professional staff assigned to specific functions, where such detailed data were not available. The allocation of staff at sub-national level to different functions, e.g. animal production issues (excluded from NPS) and animal health issues (included in NPS), was estimated on basis of the following approaches: estimates collected at central level, visits to a sample of sub-national level units (e.g. provincial administrations) and analysis of the number of veterinary staff compared to other professional staff.

In other case study countries, however, budget data for sub-national units are not available at the central/federal level, e.g. because they operate under the authority of sub-national government bodies. In these countries, budget data were analysed for a sample of between two and five sub-national administrative units, e.g. provinces.[38] In the selected provinces, budget data of relevant veterinary agencies were scrutinised (mainly provincial and/or district VS, and where applicable, municipal/communal veterinary units). The data collected were then extrapolated to

[37] This approach applies for general expenditures. In cases that a specific type of expenditure could be clearly allocated to the NPS, such as expenditures for vaccines, these were included fully, even if part of the general costs had to be excluded because the department also fulfils functions outside the boundary of the NPS.

[38] The number differed between countries and depended on the data availability, size of the country and complexity of the system.

obtain budget data for all relevant sub-national units, again on the basis of the number of all professional staff members with veterinary functions (where available), or on basis of the number of veterinarians, where no other data were available.[39] This type of extrapolation was used for Mongolia, Romania, Uganda, and Vietnam. It is one of the important limitations of this study that cost data had to be extrapolated on the basis of a relatively small number of sub-national units and, as sensitivity analysis of the data obtained has indicated, the results of the extrapolation have a significant impact on the results. For this study, several checks and cross-checks of the extrapolation results have been conducted and the data obtained represents the best possible estimate. However, the study underlines the need for more detailed data collection at the central level concerning the financing, activities and infrastructure of the sub-national level to allow more detailed assessments.

Issue 6: Limited data concerning depreciation

Issue

Budget data in most of the case study countries do not consider the use of fixed capital, i.e. the loss of value of a fixed asset such as a car or building during its lifetime (depreciation).

Resolution

Where available, budget data concerning depreciation were used (as was the case for some institutions in Kyrgyzstan, Mongolia, and Vietnam). For organisations for which no data on depreciation were available, the consumption of fixed capital was calculated using the straight-line depreciation method. The calculation was based on the inventory of capital assets in possession of the relevant administrations (data collected by the evaluation team during the country visits) and on estimates of useful lives and replacement costs in international dollars of capital assets, as collected in the framework of WHO-CHOICE project.[40] As data on replacement costs were available on the WHO-CHOICE website for the year 2000 only, estimates for 2007 were obtained using a deflator index as provided by the World Economic Outlook Database (April 2008) of the International Monetary Fund.[41] In case study countries in which it was not possible to obtain reliable information on capital assets, a typical value for the depreciation of fixed capital was applied, amounting to 20% of total operating costs of the laboratories and to 5% of total operating costs of each of the other institutions. These percentage rates were defined on the basis of ranges of values in case study countries for which relevant data were available or could be calculated, and complementary research.

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[39] The evaluation team ensured that for the extrapolation of staff and budget data only professional staff members with veterinary functions relevant for the NPS were considered. Professional staff working in the area of livestock production and other excluded areas (and related costs) were not considered. In case that staff members worked on both included and excluded areas, e.g. both on animal health (included) and livestock production issues (excluded), staff numbers (and related costs) were adjusted according to the time spent for the different functions (similar to the approach described in issue 4 above). If the sample of between two and five sub-national administrative units concluded, that on average e.g. 40% of the professional staff working time of a sub-national unit was spent on NPS related activities, this factor was taken into account for the extrapolation of staff and budget data.

[40] http://www.who.int/choice/costs/en/, see below, section 2.4.1.

[41] Source: http://www.imf.org/external/pubs/ft/weo/2008/02/weodata/weoselser.aspx?c=948%2c686%2c238%2c968%2c186%2c746%2c298%2c582%2c917&t=9

Issue 7: Difficulty to compare results of country studies

Issue

The aim of the cost assessment is to provide an estimate of the overall costs of the National Prevention System in case study countries. The assessment focuses on the actual costs of the National Prevention System for the baseline year 2007. Budget data were collected in national currency and were therefore not directly comparable across case study countries.

Resolution

To allow for cost data that are comparable between case study countries, budget data collected in national currencies were converted into international dollars using the implied Purchasing Power Parities conversion rate (national currency per current international dollar) for 2007, as provided by the World Economic Outlook Database of the International Monetary Fund.[42] In cases where expenditures were given in foreign currencies (e.g. donor programmes in Euro or in US dollars), these expenditures were first converted into national currencies using the foreign exchange rate as of 31/12/2007,[43] and then converted into international dollars, using the appropriate Purchasing Power Parities conversation rates for 2007.

The methodological approach adopted allowed to overcome the above-mentioned challenges and to generate the necessary data sets to provide costs estimates for the National Prevention Systems in the case study countries (see section 3).

2.3. Discussions of elements of the National Prevention Systems (NPS)

The previous section has provided a brief overview of the approach taken for the study. The approach is explained in further detail in this section. It is structured as follows:

The first sub-section explores the role of the public sector in providing animal health services and explains the rationale for focusing on public sector costs for the National Prevention System. This is followed by a discussion of the concept of "prevention" and its main elements. Based on this analysis, the boundaries of the National Prevention System and its main functional units as used in the cost assessments of this study are described. The following sub-section details the approach used for assessing costs of NPS functional units. Finally, the contextual background in which the National Prevention System operates and factors that can influence performance and costs are discussed.

2.3.1. The importance of the public sector in providing animal health services

Traditionally formal animal health services in developing countries were provided largely by government veterinarians employed within the public sector. However, during the 1980s growing fiscal constraints on government spending, together with public concerns regarding the efficiency and accountability of state intervention, were associated with increased public and political enthusiasm for privatisation of economic activity. In both developed and developing

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[42] Source: http://www.imf.org/external/pubs/ft/weo/2008/02/weodata/weoselser.aspx?c=948%2c686%2c238%2c968%2c186%2c746%2c298%2c582%2c917&t=9

[43] Exchange rate as of 31/12/2007 as provided by http://www.oanda.com/

countries, greater reliance was placed on private enterprise and market forces for the provision of animal health services, as in the supply of other goods and services.[44] Attempts at privatisation of Veterinary Services, in many countries, have however brought few improvements in service provision and among other weaknesses private veterinarians have tended to avoid rural constituencies, concentrating instead on the more lucrative urban markets.[45] Also, experiences with recent outbreaks of trans-boundary animal diseases (TADs) such as HPAI have emphasised the importance of public Veterinary Services. Tasks such as surveillance, prevention, control and eradication of highly contagious diseases with serious socio-economic, trade and public health consequences, quarantine and movement control, emergency responses, disease investigation and diagnosis, and vaccination and vector control in relation to these diseases require public intervention and are unlikely to be adequately provided by private enterprise alone.

Of course, some of the measures for disease prevention are appropriate for either public or private delivery. In practice a wide range of possibilities exist for sharing responsibility, in the provision of animal health services, between the public and private sectors. For instance, responsibility for delivery of a publicly funded vaccination campaign may be contracted out to private veterinarians. Conversely, government regulations for disease control, such as the imposition of animal movement controls, transfer responsibility for meeting the associated costs to private livestock producers. Private sector contributions to the provision of animal health services may also be increased by government action to provide an ‘enabling environment’ by the collection and dissemination of relevant information to the public, establishing user rights and codes of practice, providing a legal framework for contracting and for setting and supervising quality and health standards.[46]

Private sector organisations exist that are capable of assuming some of the roles of the public sector. Of these there are two main groups, namely membership organisations (MOs), such as farmer co-operatives, and non-member organisations (NMOs). NMOs are generally better known as Non-Governmental Organisations (NGOs). They rely on voluntary donations from non-beneficiaries and represent income transfers from one sector of society to another. Transfers may occur within a country or between different countries, and may be motivated by a political agenda in addition to purely charitable objectives. In the animal health area, NGOs are mainly involved in the provision of clinical services and the supply of veterinary pharmaceuticals. In some cases local services are strengthened by training local para-veterinarians who then set up their own practices, or by supporting the establishment of local livestock producer associations.

Both membership and non-membership organisations are able to deliver ‘collective goods’ and can therefore benefit from increasing returns to scale. As such they can provide useful services to supplement those provided by the public sector. However, their scale of operation is generally limited by financial and organisational constraints. Thus the activities are generally

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44 Holden, Ashley & Bazeley 1996.

45 Anon 1992, Odeyemi 1994, Otieno, McLeod & Upton 2000. Analysis, based on ‘Public Sector Economics’ and the ‘New Institutional Economics’ indicates reasons for this type of ‘market failure’ and the role of the state in their correction (see e.g. Stiglitz 2000, Rushton & Leonard 2009). The failure of private markets to meet all the affordable needs of society, for goods and services, in general, and, more specifically, causes for failure of private markets that are relevant to the provision of animal health services have been widely discussed in the literature. Relevant literature in the area of animal health economics includes e.g. Umali, Feder & de Haan 1992, Umali, Feder & de Haan 1994, Holden, Ashley & Bazeley 1996, Holden 1999, Leonard 2000, Leonard 2004, Ahuja 2004, Riviere-Cinnamond 2004. Also relevant in this context is the discussion of the public good character of certain services, and the related discussion on global public goods, see e.g. Grunberg, Kaul & Stern, 1999, Sandler 2005, Smith 2003.

46 Rushton & Leonard 2009.

localised and serve specific groups of producers. In the case of MOs, the problem of unlawful free-riding is likely to increase with increasing size of the association. Both types of organisation may suffer from a lack of professional veterinary personnel, and sometimes from poor managerial provision. Hence 'scaling up' of collective action to the national level is difficult to achieve so national animal health policies and National Prevention Systems generally require public sector intervention.

It is concluded that, although services such as clinical diagnosis and treatment may be delivered effectively and efficiently by private veterinarians, others require public sector intervention. All the main animal disease preventive measures fall into the latter category, for which government must take overall responsibility. Hence, for the purposes of this study attention is focused on public sector expenditures. The contributions of private individuals, membership groups and Non-Governmental Organisations, to animal disease prevention, are generally limited to specific localities or social groups and can only form part of the National Prevention System. Assessment of the private sector contribution is difficult because information may be lacking, for instance on the private uptake of vaccines particularly in less accessible parts of the country.

Based on these considerations, the previously given definition of the National Prevention System was derived.[47] The National Prevention System, in this study, is therefore understood to include all services and activities of the public Veterinary Services, and other relevant public providers at national and sub-national level, allowing early detection and rapid response to emerging and re-emerging animal diseases, including the services of accredited private veterinarians undertaking public service missions financed from the public budget.[48]

2.3.2. Defining animal disease prevention

Animal disease prevention in the context of this study is understood as precautionary measures, such as surveillance, biosecurity and border controls, aimed at minimising the risks of outbreaks of epidemic animal diseases.[49] Prevention measures are required to be in operation even in periods of "peace time" when the threat of disease outbreaks appears remote. It is argued that reliance on "active" ex-ante preventive disease control policies, of this nature, are preferable to "passive" measures such as emergency and contingency funds for sanitary emergency ex-post response.[50] Evidence suggests that the costs of disease prevention are more than justified by the benefits resulting from the reduction in losses from disease outbreaks.[51]

Two key components of ex-ante preventive control policies are a) surveillance and b) biosecurity. They depend on both the contributions of individual stakeholders, farmers and livestock herders, traders, processors and retailers, and adequate public action, especially in the context of highly contagious diseases with serious socio-economic, trade and public health consequences:

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[47] As explained in section 2.2, issue 3, it was needed, for the purposes of the study, to develop a clear definition of the NPS. In particular, the precise delineation of functions directly relevant for the NPS (see section 2.3.3) allowed making sensible cost comparisons between case study countries (see section 4).

[48] The expression "services of accredited private veterinarians undertaking public service missions" refers to those accredited veterinarians who actually conducted public services missions and were paid for their services from the public budget for the specified period of time (i.e. year 2007 in the case study countries). Public service missions may include, for example, vaccination programmes (e.g. in Mongolia and Morocco) and meat inspection in slaughterhouses (e.g. in Turkey).

[49] This includes prevention of trans-boundary animal diseases (TADs), but is not limited to them. For a discussion of trans-boundary animal diseases see e.g. Horst et al 1999, Otte, Nugent & McLeod 2004.

[50] Rushton & Upton 2006, Beach, Poulos & Pattanayak 2007.

[51] Agra Ceas Consulting 2007.

Surveillance is the process of identifying, recording and monitoring the health situation, or the risk factors, in a given animal population and the associated food chain.[52] Public sector involvement is a prerequisite in this process. The collection and recording of surveillance results provide for early warning and rapid response if an outbreak occurs. Establishment of disease monitoring, together with information on host livestock populations and their movements, permits, for example, epidemiological analysis of disease outbreaks.[53] Where wildlife disease vectors are involved, surveillance of their population movements may also be beneficial. Epidemio-surveillance systems generally share a centralised management, where epidemiological analysis, mapping and modelling are conducted, and active surveillance surveys of disease incidence may be organised.[54] Thus diagnostic laboratories and epidemio-surveillance agencies are the main areas of public sector involvement. All public sector measures concerning surveillance are considered in this study to be a part of the National Prevention System.

According to the OIE definition, a *biosecurity plan* "means a plan that identifies potential pathways for the introduction and spread of disease in a zone or compartment, and describes the measures which are being or will be applied to mitigate the disease risks, if applicable, in accordance with the recommendations in the OIE Terrestrial Code".[55] *Biosecurity* involves therefore an array of sanitary and quarantine measures for limiting disease spread, in producing livestock and processing the products; described in more detail as follows:

> *"The primary goal of biosecurity is to protect against the risk posed by disease and organisms; the primary tools of biosecurity are exclusion, eradication and control, supported by expert system management, practical protocols, and the rapid and efficient securing and sharing of vital information. Biosecurity is therefore the sum of risk management practices in defence against biological threats."*[56]

Public sector intervention is needed in the context of biosecurity at the national level, e.g. for providing and administering border control posts which limit entry of livestock diseases,[57] although standards achieved inside the country are highly dependent on the behaviour of private stakeholders. For diseases transmitted by wildlife, programmes for control of these wildlife vectors generally require communal, public action. Similarly public services are generally involved in meat inspection at abattoirs and other slaughter points. In addition, a range of different regulations may be imposed to improve national biosecurity at all levels, including through setting appropriate biosecurity standards that are to be implemented by livestock producers, traders and the processing industry. Possible measures include compartmentalisation,[58] zoning, movement controls, quarantine rules for sick animals, disinfection and other sanitary requirements, market regulations and mandatory requirements for enclosed livestock housing, animal transport and processing. The design and introduction of such regulations are likely to be included in the general disease contingency planning. Implementation involves public administration in promoting compliance, and in some cases

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[52] PACE 2006. The OIE definition of "epidemiological surveillance" is as follows: Epidemiological surveillance means the investigation of a given population or subpopulation to detect the presence of a pathogenic agent or disease; the frequency and type of surveillance will be determined by the epidemiology of the pathogenic agent or disease, and the desired outputs (OIE TAHC 2008).

[53] James 2005.

[54] Active surveillance refers to the systematic collection of data on the total targeted animal population or on a sample of suspected animals, see Heim *et al.* 2006 and Dufour *et al.* 2006.

[55] OIE 2008c.

[56] NASDA 2001.

[57] Rushton *et al.* 2002.

[58] Scott *et al.* 2006.

enforcement of the policies. In conclusion, in this study all public sector measures, programmes and systems concerning biosecurity are considered to be a part of the National Prevention System.

Vaccination is a tool that may be used as part of a National Prevention System (including for many of the diseases listed in Annex 4). However, vaccination may be used in four different contexts:[59]

- As part of a stamping-out programme, whereby instead of culling many neighbouring herds, or flocks, designated as dangerous contacts, ring vaccination is applied in the surrounding area;
- As part of a government programme to reduce the number of outbreaks and the level of circulating virus in an endemic country or region, by applying widespread vaccination;
- In a country that is free, or almost free, of the disease, for targeting areas considered to be at high risk of its re-emergence;
- In a private capacity it may be used by livestock producers as insurance against disease outbreaks in their own herds or flocks (if use of the vaccine is authorised by the government).

It is debatable whether vaccination, in the first of these contexts, should be included in the list of "peacetime" preventive activities, since it is more readily designated as an emergency response. Although the fourth context, where producers vaccinate their own flocks, is clearly a prevention measure, the only public sector responsibility and costs will be those for quality control and monitoring. The direct costs of vaccination do not appear in the public sector accounts in this case. In contexts 2 and 3, vaccination contributes to the National Prevention System and the costs are generally publicly funded. In some cases, vaccines are provided as part of a foreign assistance project, but the local costs of storage, distribution and delivery are funded from the domestic budget. In contexts 1 and 3, where vaccination is a component of contingency planning, domestic vaccine banks may be established. However, countries may also rely on "virtual vaccine banks" based on contractual agreements with overseas suppliers to provide vaccines in the event of an emergency outbreak.

In this study, public sector costs related to vaccination in contexts 2 and 3 are included in the National Prevention System. Context 1 is discussed in the following paragraph concerning emergency control measures. Vaccination in context 4 is not relevant for the NPS.

Given that the costs of National Prevention Systems relate specifically to precautionary preventive measures, in "peace time" periods, the costs of *emergency control measures* related to outbreaks of relevant animal diseases, such as stamping out, local movement controls and ring vaccination, and compensation of farmers could at a first glance be considered to be not relevant for the National Prevention System. However, this approach would limit the scope of the study significantly, and has therefore not been applied. Reasons for this are as follows:

Firstly, the rapid control of primary outbreaks is a very important element of prevention of secondary outbreaks, and ultimately, catastrophic outbreaks of epidemic animal diseases.

Secondly, in practical terms, it would, in some cases, be difficult to separate the activities (and costs) of e.g. sub-national Veterinary Services concerning (routine, small scale) emergency control measures from other "peace-time" activities considered to be relevant for the NPS.

[59] McLeod *et al.* 2007, Rushton *et al.* 2002.

Thirdly, experiences from the public health sector indicate that the assessment of prevention capacities of a system may be most relevant for policy makers if a broad perspective is taken, rather than limiting the scope too narrowly on specific prevention measures that may miss the overall institutional context in which they are taken. Therefore, the previously listed decision rule for the relevance of emergency control measures for the NPS has been developed as follows:

- Included in the NPS are public control measures applied in the event of a limited outbreak (such as compulsory slaughter, movement standstills, and ring or prophylactic vaccination, and compensation of owners of culled livestock in limited outbreaks). Related costs are considered to be part of the costs of a National Prevention System as long as this does not involve emergency resources (e.g. ad-hoc culling teams) or extra-budgetary contingency funding characteristic for sanitary crises;
- Excluded from the NPS are control measures related to sanitary crises (such as catastrophic outbreaks of animal diseases). In a pragmatic definition, excluded from the costs of the National Prevention System are those measures related to major outbreaks that are financed through contingency funding and involve outside resources (e.g. ad-hoc culling teams and extra budgetary means for compensatory funding, etc.).[60]

The costs of contingency planning, and preparedness for possible future resource requirements for emergency disease response, are considered key components of National Prevention Systems and are included, even if they relate to sanitary crises.[61]

2.3.3. Boundary of NPS used in this study

Based on the considerations in the previous sections, and also taking into account the structure of the OIE-PVS Evaluation, as well as the results of an initial country study, the National Prevention System is considered to include the functions listed below.[62] Functions can be performed by one or more institution.

[60] In cases where the application of the decision criteria concerning control measures was difficult because of the structure of the budget data, this is discussed in the country study.

[61] See also Geering, Roeder & Obi 2004.

[62] In this study, functions are understood as specific types of services provided and activities performed, either within the boundary of the National Prevention System, or outside.

1. Functions that are directly relevant for the National Prevention System are:
   - Epidemiological surveillance[63]
     - Passive surveillance[64]
     - Active surveillance[65] (surveillance programmes)
   - Veterinary laboratory diagnosis
   - Disease prevention, control and eradication, and early detection and emergency control, including designing contingency plans and control measures applied in the event of a limited outbreak (such as compulsory slaughter, movement standstills, and ring or prophylactic vaccination, and compensation of owners of culled livestock in limited outbreaks). Related costs are considered to be part of the costs of a National Prevention System as long as this does not involve emergency resources (e.g. ad-hoc culling teams) or extra-budgetary contingency funding characteristic for sanitary crises
   - Border inspection
   - Inspection of live animal markets
   - Public veterinary inspections in slaughterhouses (both ante-mortem and post-mortem), to provide information concerning disease prevalence – other food safety inspections are excluded from the National Prevention System, as in these cases the public health aspects dominate to a large extent
   - Services provided by the Veterinary Statutory Body (if existing)
   - Central functions, including coordination, communication, reporting, risk analysis, emerging issues, preparation of legislation and regulations and related international harmonisation, technical innovation, continuing education, official representation, transparency, traceability, enforcement (to the extent that this is part of the functions of the veterinary staff), "peace-time" costs for setting up compensation schemes, etc.
   - Interactions and links with stakeholders (such as farmers, livestock herders, farmer associations, relevant government agencies and ministries, private practitioners, processing industry) as far as they are relevant for the early detection, surveillance and prevention of animal diseases and zoonoses

2. Functions that are *not* directly relevant for the National Prevention System are:
   - Quality control of veterinary medicines and residue testing
   - Veterinary public health and food safety inspections other than public veterinary inspections in slaughterhouses (see above). Excluded are therefore inspection services relating to dairy products, eggs, and other food establishments

[63] See footnote 52.

[64] Passive surveillance refers to the compulsory reporting of clinically suspect animal health status by owners, veterinarians and other stakeholders involved in handling animals and the follow-up of these animals by government Veterinary Services. The term 'passive' refers to the reliance on notification to the appropriate authority by individuals in the field. Both types of surveillance (passive and active) should be based on the results of risks analyses, which allow to target the location where surveillance should be implemented and how it should be realised (Heim *et al.* 2006 and Dufour *et al.* 2006).

[65] See footnote 54.

- Veterinary education (other than in-service education of public veterinary staff) and research. Excluded are therefore universities and other research institutions[66]
- Implementation measures related to sanitary crises and related contingency and compensatory funding. This relates to major outbreaks, the costs of which are not considered to be part of the costs of the National Prevention System. In a pragmatic definition, excluded from the National Prevention System are costs for those measures related to major outbreaks that are financed through contingency funding and involve outside resources (e.g. ad-hoc culling teams and extra budgetary means for compensatory funding)
- Animal welfare related activities
- Veterinary activities related to aquatic animals[67]
- Production issues, e.g. related to genetic improvement of livestock, etc.

All public providers of the functions listed under point 1 in a given country are considered to be part of the National Prevention System, both at the national and sub-national level, and including services of accredited private veterinarians undertaking public service missions financed from the public budget. *This boundary of the National Prevention System is also the boundary for the cost assessment in this study.*[68]

2.3.4. Main functional units of the National Prevention System

Studies in the public health sector indicate that it is difficult to compare data from different countries, not only because of differences in budgetary reporting standards, but also because of deviations in the definitions of functions. For this reason, in the public health field there are long-running efforts of international organisations to reach data that is more readily comparable between countries by introducing National Health Accounts.[69] This is a long term process that might be worth considering in the animal health field as well.

In the context of this study, cost data regarding specific functions of the National Prevention System is only comparable between countries to the extent that the delineation of different functions as defined by the budgetary reporting of the providers involved does allow this. In other words, if a specific function and related departments/units of providers are very differently defined in the budget of country A compared to country B, it is difficult to compare cost data related to this specific function – to compare the costs of the National Prevention System is in these cases only possible at the aggregated level. The study consequently focuses on the costs of

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66 Without underestimating the importance of an adequate supply of veterinary graduates for the NPS, veterinary education was excluded from the scope of the study for methodological considerations, and to increase comparability between countries. Costs of veterinary education are strongly influenced by the education system of a given country, which is unrelated to the veterinary system in a narrower sense.

67 The main reason for this being that the PVS Evaluations, that are a basis for this study, currently do not evaluate the capacities of the VS in this area.

68 The boundary of the NPS used in this study is therefore much broader than in the PACE study (see section 2.4.1).

69 National health accounts (NHA) depict the current use of resources in the health system. If implemented on a regular basis, NHA can track health expenditure trends, an essential element in health care monitoring and evaluation. NHA methodology can also be used to make financial projections of a country's health system requirements. Finally, they offer the possibility of comparing one country's health system expenditures with those of other countries. For an overview, see WHO 2003, Guide to producing national health accounts: with special applications for low-income and middle-income countries.

main functional units. This approach allows comparison of key cost centres of the National Prevention System across case study countries.

The main functional units considered are:

- At central level:
  - Central public Veterinary Authority (including veterinary inspections in slaughterhouses, excluding veterinary diagnostic laboratories)
  - Border inspections
  - National veterinary diagnostic laboratory/ies
  - Veterinary Statutory Body[70]
- At sub-national level:
  - Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)
  - Municipal veterinary departments
  - Sub-national veterinary diagnostic laboratories

Expenditures financed by donor programmes are identified separately.

2.4. Discussion of approach for cost assessment

2.4.1. Review of relevant approaches for cost assessment

Relevant approaches in the animal health sector

Little literature exists concerning the costs of the prevention of animal diseases in a systemic perspective. One of the relevant studies in this field was conducted under the framework of the Pan-African programme for the Control of Epizootics (PACE) in 2005.[71] This study analyses and compares the costs of Veterinary Epidemiological Surveillance (VES) in a sample of four countries (Benin, Ghana, Mauritania, and Senegal). The methodological approach involves data collection at central level and at field level through the selection of a representative sample. The methodology classifies costs in two categories, namely fixed costs and variable costs.

Data collected on fixed costs include:

- *Depreciation of investments*: The depreciation for each commodity is computed as being linear and corresponding to the ratio between the value of the commodity at purchase over its life span. The residual values were considered to be nil;
- *Personnel cost (salaries and top-ups)*: Average monthly salaries of VES actors are exempt from taxes. At central level, the individuals in charge of epidemiological surveillance are expected to use 100% of their time on surveillance activities;
- *Maintenance of equipment*: Costs related to the maintenance of vehicles, motorcycles, cold chain equipment, and computer equipment.

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[70] Where existing. The expenditures of the Veterinary Statutory Body are considered here, because these bodies are generally financed by compulsory membership fees, which have the character of a quasi-tax.

[71] See PACE 2005.

Data collected on variable costs (operations) comprise:

- *Notification costs*: Costs related to correspondence fees;
- *Information-Education-Communication costs*: Costs related to the design of communication and public awareness raising plans and related material;
- *Training and upgrading costs*: Costs incurred for participation in regional and international training and upgrading sessions;
- *Costs of participation and organisation of meetings*: Costs related to the harmonisation of surveillance activities at regional level requires coordination meetings at different levels;
- *Costs of laboratory analyses*: Costs of analysing samples submitted by the epidemiological surveillance system to the national laboratory or to reference laboratories;
- *Miscellaneous operating costs*: Costs related to the purchase of fuel, office stationary, sampling related consumables and costs of coaching, supervision and evaluation missions in the field carried out by the Central Coordination Unit (national level).

The study concludes that Veterinary Epidemiological Surveillance costs 0.1 to 0.5 Euro per Tropical Livestock Unit (TLU)[72] and 0.4 Euro per km² (including salaries). When salaries are excluded, the cost of Veterinary Epidemiological Surveillance amounts to 0.08 to 0.24 Euro per TLU. The study also finds that operational expenditures represent on average 67% of total expenditures while staff expenditures represent 33% of total expenditures.

According to the authors, the standardised parameters identified by the study can be used to compute estimates for other countries of the West Africa region, which have eco-climatic, agricultural and economic characteristics comparable to at least one of the four countries of the study. As an example, the parameters identified for Benin are used to extrapolate the results to Togo, as Benin is considered to be the country with the livestock characteristics and organisation of Veterinary Services the closest to those of Togo.

More recently, a study by Tambi (2006) estimated the costs of a functional epidemio-surveillance system for a sample of six countries (Benin, Central African Republic, Côte d'Ivoire, Guinea Bissau, Tanzania, and Uganda) using the following cost elements: [73]

- *Salaries*
- *Allowances*
- *Transportation*
- *Laboratory, field and office equipment and materials*
- *Depreciation on equipment*
- *Communications*
- *Production and dissemination information*
- *Sample collection and analysis*
- *Training*

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[72] Methodology for the calculation of TLUs (or VLUs) may vary between studies. Costs per TLU (or VLU) may therefore not be directly comparable.

[73] Tambi 2006.

- *Other miscellaneous items*

The main conclusions of the study are as follows:

- Salaries account for 40% to 69% of the total cost of surveillance
- Travel allowances account for 14 to 23% of the total cost
- Transport accounts for 5 to 23% of the total cost
- Depreciation on equipment accounts for 4 to 12% of the total cost
- The unit cost of surveillance per VLU varies from 0.11 to 0.71 Euro
- The average cost per VLU for the six countries is 0.37 Euro

An earlier study by Anteneh (1991) examined the past patterns of government expenditure and staffing of livestock services in sub-Saharan Africa and the factors which seem to determine these patterns. The methodological approach involves the analysis of variance, regression analysis and the calculation of a number of relevant ratios, e.g. related to agricultural GDP, livestock output, etc.[74] For the purposes of the study by Anteneh, data were obtained from secondary sources (e.g. government budget documents, unpublished reports, government publications, development agencies and research institutes reports, FAO production yearbooks, and World Bank data), and interviews with government officials concerned with the management of livestock services.

Another study by Turkson and Brownie (1999) assessed the adequacy of financing and resource allocation from 1990 to 1995 in Ghana. It examined a number of indicators, including the following:[75]

- Total Veterinary Services Department budget as proportions of the national budget, the gross domestic product (GDP) and agricultural gross domestic product (AGDP)
- Proportions of the veterinary budget allocated to salaries
- Ratio of salaries to non-staff expenditures
- Recurrent expenditure per veterinary livestock unit
- Non-staff expenditures per veterinary livestock unit
- Non-staff expenditures per technical staff

The authors found that in 1995 the Veterinary Services Department budget represented 0.05% of GDP, that non-staff expenditures per VLU amounted to 0,9 USD[76] and a salaries/non-staff expenditure ratio of 0.6.

[74] The ratios calculated in the study by Anteneh included: Agricultural GDP (AGDP)/Total GDP; Livestock output (LGDP)/AGDP; Livestock recurrent expenditure (LRE)/LGDP; LRE/TLU (Tropical Livestock Unit); TLU/high level staff (HL)[74], TLU/auxiliary personnel (AP), TLU/total staff, AP/HL; Staff to non-staff expenditure ratio; LRE/total agricultural recurrent expenditure (ARE); R-ratio (the R-ratio is meant to measure the "appropriateness" of livestock recurrent expenditure levels relative to the levels of recurrent expenditure on all agricultural services. This is the coefficient resulting from the percentage share of recurrent expenditure on all agricultural services (ARE) in agricultural GDP (AGDP) divided by the percentage share of livestock recurrent expenditure (LRE) in livestock GDP (LGDP) [R= (ARE/AGDP)/(LRE/LGDP)]. A ratio of less than 1 would mean that the countries are spending disproportionately less than the apparent contribution of livestock to agricultural output would indicate.

[75] Turkson & Brownie 1999.

[76] 1990 USD.

Relevant approaches in the public health sector

Estimating systemic costs in the human health sector is more common than in the animal health sector. It is worth considering the methodologies and tools that have been developed in the human health sector as they may also be used, with certain limitations, for the analysis of the costs of National Prevention Systems for animal diseases and zoonoses.

In 2003, the World Health Organization (WHO) published a "Guide to producing national health accounts: with special applications for low-income and middle-income countries". National health accounts depict the current use of resources in the health system. If implemented on a regular basis, they can track health expenditure trends, an essential element in health care monitoring and evaluation. The Guide suggests a number of useful approaches that have been reviewed for the present study. Among others, the Guide proposes a classification scheme for the resources used to produce health care goods and services, which is based on the framework given by the International Monetary Fund (IMF) Government Finance Statistics manual. This classification is presented in the following Table.

Table 2.2: Resource cost (RC) or economic classification

Code	Description
Operational expenditures	
RC.1	Current outlays
RC.1.1	Compensation of employees
RC.1.1.1	Wages
RC.1.1.2	Social contributions
RC.1.1.3	Non-wage labour income
RC.1.2	Supplies and services
RC.1.2.1	Material supplies
RC.1.2.1.1	Drugs and pharmaceuticals
RC.1.2.1.2	Other supplies
RC.1.2.2	Services
RC.1.3	Consumption of fixed capital
RC.1.4	Interest
RC.1.5	Subsidies to providers
RC.1.6	Transfer to households
RC.1.9	Other current expenditure
Capital expenditures and transfers	
RC.2	Capital expenditure
RC.2.1	Buildings
RC.2.2	Movable equipment
RC.2.2.1	Vehicles
RC.2.2.2	Other
RC.2.3	Capital transfer to providers

Source: WHO 2003, Guide to producing national health accounts: with special applications for low-income and middle-income countries.

On the basis of this classification, adapted for the animal health field, the costs of main functional units of the National Prevention Systems are analysed in this study (see next sub-section).

Other useful approaches from the public health field include methodological tools and databases prepared in the framework of the WHO-CHOICE project.[77] This is a WHO initiative developed in 1998 with the objective of providing policy makers with evidence for deciding on the interventions and programmes which maximize protection of health for the available resources. To achieve this, WHO-CHOICE reports the costs and effects of a wide range of health interventions in 14 epidemiological sub-regions (world divisions based on geographical location

[77] "CHOosing Interventions that are Cost Effective" project, Website: http://www.who.int/choice/costs/en/.

and epidemiological profiles). The results of these cost-effectiveness analyses are assembled in regional databases, which policy makers can adapt to their specific country setting.

The WHO-CHOICE tables of costs and prices relevant for cost analyses of health interventions include, for example, data on prices of programme cost inputs (i.e. personnel costs, media and information, education and communication operating costs, transportation operating costs, utilities, building capital costs, transportation capital costs and other costs), assumptions for resource use (i.e. estimated amount of resources consumed per full-time equivalent of persons working at the national or district level per year),[78] as well as prices and useful lives for capital and tradable goods. It is this standard cost data concerning equipment, such as computers, telephones or cars, that has been used for estimating the consumption of fixed capital in the current study for institutions, for which relevant data were not available (see sections 2.2 above).

2.4.2. Classification system of expenditures used for cost assessment

The classification system used for this study, developed on basis of the Resource cost (RC) or economic classification (see previous sub-section), is presented in the following Table:

Table 2.3: Cost classification used for this study

Type of expenditure	Definition/Examples
Operating expenditures	*Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided.*
Staff costs	Wages, social contributions and non-wage income of employees, such as in-kind payments (in the resource cost (RC) or economic classification this type of expenditure is called “compensation of employees”).
Material supplies	Veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles, etc.
Services	Fees for accredited private veterinarians who undertake public service missions, and if subcontracted, laboratory diagnostics, communications, training of employees, etc.
Consumption of fixed capital	Reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings, etc.
Compensation of livestock holders	For animals culled for disease control purposes.
Other current expenditures	Travel costs, per diems, interest, subsidies, maintenance, utilities, etc.
Capital expenditures and transfers	*A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time.*
Buildings	Office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings.
Movable equipment	Computers, telecommunications equipment, vehicles, laboratory equipment, etc.
Capital transfers	Capital transfers are transactions in-cash or in-kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred.

Source: Civic Consulting, adapted from resource cost (RC) or economic classification, WHO 2003.

[78] For example, one full-time staff is assumed to use 2 reams of paper per year and 8 square meters of office space.

Based on this cost classification scheme, the total actual expenditures of the relevant main functional units of the National Prevention System is determined for each country for the baseline year 2007 on basis of the available data.[79]

2.4.3. Calculation of the costs of the National Prevention System

The data collected and processed for each main functional unit is used to calculate the costs of the National Prevention System for each case study country. Under the assumption that all main functional units only provide functions that are relevant for the National Prevention System, the total costs of the National Prevention System would be:

$$C_{NPS} = \sum_{i=1}^{n} C_i$$

With:

C_{NPS}	Total cost of National Prevention System
C_i	Total cost of main functional unit i (functions directly relevant for the NPS only)
n	Number of main functional units

However, in reality, the main functional units fulfil other tasks in addition to their functions in the National Prevention System. This means that they are not *single function providers* (such as a local veterinary post or a stand-alone veterinary laboratory), the costs of which could be simply added up, but rather *multifunction providers*. For multifunction providers, the costs of the different functions have to be determined, as has been described above (section 2.2). Taking into account the existence of *multifunction provider*, the equation above changes as follows:

$$C_{NPS} = \sum_{i=1}^{n} (C_{Ti} - C_{Oi})$$

With:

C_{NPS}	Total cost of National Prevention System
C_{Ti}	Total cost of main functional unit i
C_{Oi}	Other costs of main functional unit i (all costs not related to functions relevant for NPS)
n	Number of main functional units

[79] In all countries, data were collected for the fiscal year 2007, which is in all case study countries except Uganda identical with the calendar year. In Uganda the relevant fiscal year lasted from 1 July 2006 to 30 June 2007. This difference is taken into account for the conversion of budget data to international dollars, and is otherwise neglected, as it is unlikely that major differences would result from this.

2.4.4. Comparative analysis of the costs of the National Prevention System in case study countries and analysis of factors that influence these costs

In order to make comparisons across case study countries feasible, cost data collected in local currency are converted in international dollars using implied Purchasing Power Parities conversion rates (national currency per current international dollar)[80] as provided by the World Economic Outlook Database of the International Monetary Fund.[81]

A sensitivity analysis is then conducted using different indicators/ratios to identify countries where costs elements are extremely high or low compared to the others.[82]

Operating costs in international dollars/VLU by main functional units are calculated for all case study countries as well as a series of key indicators:

- Indicators related to operating expenditures for the National Prevention System
    - Total public operating expenditures/Veterinary Livestock Unit (in international dollars)
    - Total public operating expenditures including donor programmes/Veterinary Livestock Unit (in international dollars)
    - Total public operating expenditures/GDP
    - Total public operating expenditures (incl. donor programmes)/GDP
    - Total public operating expenditures/AGDP (agricultural GDP)
    - Total public operating expenditures including donor programmes/AGDP
    - Donor programmes VS/Total public operating expenditures including donor programmes
    - Staff costs/Total public operating expenditures
    - Non staff operating expenditures/Total public operating expenditures
    - Non-staff operating expenditures/Veterinary personnel (international dollars)
    - Non-staff operating expenditure/Veterinary Livestock Unit (in international dollars)
    - Non-staff operating expenditure/AGDP
    - Total operating expenditures at central level as percentage of total
    - Total public operating expenditures/National budget
    - Total public operating expenditures (incl. donor programmes)/National budget
- Indicators related to staff of the National Prevention System:
    - Number of veterinary paraprofessionals NPS/Number of veterinarians NPS
    - Number of public veterinarians NPS /Number of private veterinarians NPS
    - Veterinary Livestock Unit/Number of public veterinarians NPS

80 Purchasing Power Parities equalises the purchasing power of different currencies in their home countries for a given basket of goods. Purchasing Power Parities take into account the relative cost of living and the inflation rates of different countries.

81 2007 exchange rates, published October 2008.

82 Livestock figures were obtained from FAOSTAT (http://faostat.fao.org).

These indicators are analysed and compared between case study countries to identify factors that may influence costs (sensitivity analysis). This not only helps to determine possible cost drivers, as well as reasons for deviations, but also allows an understanding of the practicality of different economic indicators that could be used in the framework of PVS Evaluations.

Finally, the assessment of the costs of the National Prevention System takes into account relevant external factors that could influence the total NPS expenditures. This analysis considers, based on results of PVS Evaluations and other international sources (e.g. World Bank data), external factors such as:

- Country-specific parameters (e.g. country size, population density, GNI[83] per capita, etc.)
- Number of outbreaks of animal diseases
- Livestock population in Veterinary Livestock Units
- Degree of export orientation of the livestock industry
- Existence of a private veterinary sector and ratio between public veterinarians and private veterinarians
- Availability of financial resources other than those originating from the government budget (e.g. funding received by international donors)

[83] Gross National Income (GNI) differs slightly from the Gross Domestic Product (GDP). GNI is GDP less primary incomes payable to non-resident units plus primary incomes receivable from non-resident units.

3. Data and results from the country case studies

3.1. Costa Rica

3.1.1. Country characteristics

Costa Rica is a country located in Central America with a population of nearly 4.5 million and a land area of 51,100 km². Costa Rica has international borders with Panama to the southeast and Nicaragua to the north, and has a coast on the Pacific Ocean to the west and on the Caribbean Sea to the east. Costa Rica has a great variety of landscapes, including mountain ranges, volcanoes, valleys and rivers, which contribute to its multiplicity of ecosystems, climates and biodiversity.

According to the World Bank categorisation, Costa Rica is an upper middle-income country, with a GNI per capita amounting to 10,700 international dollars in 2007. Approximately a fifth of the total Costa Rican economically active population work in the agricultural sector, which accounts for 9% of the total Gross Domestic Product (GDP). In 2007, livestock population amounted to 1.4 million Veterinary Livestock Units (VLU).[84]

Table 3.1: Country characteristics

Country characteristics	
General country data	
Land area[(a)]	51,100 km²
Total human population (2007) [(a)]	4.4 million
Agricultural population (2004) [(b)]	803,000
Economically active population in agriculture as share of total economically active population (2004) [(b)]	18%
Human development index value (2005) [(c)]	0.846
Gross Domestic Product, (billions of international dollars, 2007) [(a)]	46.02
GNI per capita, PPP (current international dollar, 2007) [(a)]	10,700
Agricultural GDP as share of total GDP (2007) [(a)]	9%
National budget expenditures (billions of international dollars, 2007) [(d)]	6.56
Livestock structure and type of production	
Livestock population (2007) [(e)]	Bovine: 1 million; Pigs: 0.55 million; Poultry: 19.5 million; Horses: 0.12 million
Livestock population in VLU (2007) [(f)]	1.37 million

[84] OIE 2008a. Veterinary Livestock Unit (VLU) is an equivalence unit for the estimate of annual veterinary cost and care.

Livestock production system [(g)]	In Costa Rica, extensive ruminant production accounts for 78% of the total livestock production while intensive production constitutes 22%. Around 50% of cattle and pig populations are concentrated in the provinces of Alajuela and Guacanaste at the north of the country, while poultry production is mainly located in the vicinity of the capital in the province of Alajuela. 2% of the land area is defined by grassland-based systems and 30% is characterised by mixed farming systems.
Type of eco-system	
Description of eco-system [(h)]	The country's landscape is characterised by numerous great rivers, coastal plains and valleys separated from north to south by four mountain ranges (cordilleras) comprising several volcanoes. Located between two oceans, Costa Rica's two extensive coastlines amount to nearly 1,300 km. The country's main geographical areas are: Tropical Lowlands (Pacific and Caribbean Coasts), North Central Plains, Central Valley and Northwest Peninsula. Costa Rica has a tropical and subtropical climate prevailing all year long. Temperatures vary according to altitude, being cooler in highlands. The rainy season last from May to November, while the dry season from December to April. Precipitations mainly fall on the Caribbean cost. The climate of the Pacific cost is thus much more dry and arid.
Indicators for livestock production	
Livestock products as share of agricultural exports (2005, in value) [(i)]	In 2005, Costa Rica exported livestock products amounting to a total value of 82,124,000 USD, which corresponds to 5.1% of the total of agricultural exports for that year.
Net exports as a percentage of livestock production in quantity (2005; 2007) [(i)]	Costa Rica exports bovine, pigs, eggs, milk and poultry. In terms of net exports, they account, respectively, for 17.51%, 10.20%, 5.91%, 3.36% and 2.83% of the livestock production.
Net imports as a percentage of domestic consumption of livestock products in quantity (2005; 2007) [(i)]	Costa Rica imports 69.57% of its domestic consumption of sheep.

Notes:

(a) World Development Indicators database, retrieved from web.worldbank.org and International Monetary Fund, World Economic Outlook Database, October 2008
(b) FAO Statistical Yearbook 2005-2006, retrieved from http://www.fao.org
(c) Based on figures from Human Development Report 2007/2008 (UNDP). Retrieved from http://hdr.undp.org/en/media/HDR_20072008_EN_Indicator_tables.pdf
(d) Calculations by Civic Consulting based on data from The World Factbook (2007), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/download/download-2007/index.html
(e) FAOSTAT Data, retrieved from http://faostat.fao.org
(f) Calculated on the basis of FAOSTAT livestock numbers and VLU coefficients from OIE Guidelines for writing of the OIE-PVS Evaluation report (2008), p.13 (slightly adapted to cover also buffaloes and rabbits).
(g) Livestock production percentages calculated on the basis of FAOSTAT livestock numbers, livestock production structure based on figures from the OIE-PVS Evaluation of Costa Rica (2007) p.62, and data on production system based on Thornton *et al.* (2002) pp. 17-21.
(h) Based on The World Factbook (2008), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/cs.html , on http://www.geographia.com/costa-rica, and on http://www.infocostarica.com/nature/geography.html
(i) FAO Trade Data, retrieved from http://faostat.fao.org. Import and export data are from 2005, production data are from 2007, while consumption data are calculated on the basis of the above-mentioned data sets.

3.1.2. Animal health situation

In 2007, the total number of outbreaks reported to the OIE was 433, of which the most frequent were Equine Infectious Anaemia (155), Brucellosis B. Abortus (140), Varroosis of Honey Bees (31), European Foulbrood of Honey Bees (21), Enzootic Bovine Leukosis (21) and Infectious Bovine Rhinotracheit (IBR/IPV) (19). The notifiable diseases with preventive measures in place are BSE, Classical Swine Fever, Avian Influenza, and Newcastle Disease.

Table 3.2: Animal Health Situation

Animal Health Situation	
Animal disease outbreaks [(a)]	The number of outbreaks reported to the OIE in 2007 was 433, of which the most frequent were: Equine Infectious Anaemia (155), Brucellosis B. Abortus (140), Varroosis of Honey Bees (31), European Foulbrood of Honey Bees (21), Enzootic Bovine Leukosis (21), and Infectious Bovine Rhinotracheit (IBR/IPV) (19).
Notifiable diseases and diseases for which measures were taken[(b)]	A total of 33 officially notifiable diseases were present in the country and declared to the OIE in 2007. Diseases with preventive measures in place: BSE, Classical Swine Fever, Avian Influenza, and Newcastle Disease.[85]

Notes:
a. OIE World Animal Health 2007.
b. OIE WAHID, data from 2007.

An overview of the animal health situation in the country is presented in Annex 5.

[85] Published in La Gaceta Nº 156 of August 13th, 2008.

3.1.3. Main functional units of the NPS

In Costa Rica, the main functional units of the NPS are all under the authority of the National Service for Animal Health (SENASA). The most frequent PVS level in the OIE PVS Evaluation of 2007 is 3. Detailed results of this Evaluation are presented on the following page.

Table 3.3: Main functional units of the National Prevention System

Main functional units of the National Prevention System for animal diseases and zoonoses	
Organisational structure of the National Prevention System	
Structure of the NPS	The VS of Costa Rica is part of the *Ministerio de Agricultura y Ganaderia* (MAG) and is under the direction of the National Service of Animal Health (*Servicio Nacional de Salud Animal* - SENASA). SENASA is divided into the following departments: o *Direccion general* (General directorate) o *Inocuidad productos origin animal* (Food safety) o *Cuarentena animal* (Border inspection and quarantine) o *Medicamentos veterinarios* (Veterinary medicines) o *Laboratorio nacional de servicios veterinarios* LANASEVE (National veterinary laboratory) o *Alimentos para animales* (Feed safety) o *Salud reproductive* (Livestock production/genetic improvement) o *Operaciones* (Sub-national operations) For the implementation of it activities on sub-national level, the department of *Operaciones* is divided in 8 operational regions, each composed of a regional office and sector offices (number varies across regions). The Central Veterinary Laboratory (LANASEVE) with its 3 regional laboratories, is integral part of SENASA and located directly with other units together near the campus of National University. Since 2007 the OIERSA (*Organismo Internacional Regional de Sanidad Agropecuaria*) responsible for the treatments at the borders, is integrated in the structure of SENASA.
Challenges for VS[86]	Introducing of a traceability system.
OIE PVS Evaluation of the Veterinary Services	
Most frequent PVS level	3
Veterinary personnel relevant for NPS	
A. Public veterinarians at central level NPS	81
B. Public veterinarians at sub-national level NPS	37
C. Total public veterinarians NPS (A+B)	118
D. Distribution of public veterinary personnel NPS (2007)	Veterinarians: 118; Veterinary paraprofessionals/other technicians: 114; Support personnel: 60
E. Private veterinarians conducting public service missions (in the framework of the NPS)	93
F. Total number of private veterinarians	753

[86] The description of the challenges for VS described in this table, and in the following country case studies, constitutes a brief summary of the issues raised during the interviews. A detailed discussion on the challenges of the VS in the country case studies may be found in the OIE-PVS Evaluations.

3.1.4. Costs of the NPS

The total public operating expenditures for the National Prevention System of Costa Rica are 11.17 million international dollars (excluding donor contributions). 76% of total operating expenditures for the NPS are disbursed at central level.

Table 3.4: Operating expenditures for 2007 in international dollars by main functional units

Main functional units	Operating expenditures	Comments
Central Level		
Central public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	4,272,644	
Border inspections and quarantine	2,254,937	
National veterinary laboratory/ies	1,902,802	This figure relates to both national and sub national laboratories.
Veterinary statutory body	441,495	
Sub-national		
Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	2,742,048	
Municipal veterinary departments		Not relevant
Sub-national veterinary laboratories		No separate budget available (see central level)
Total public expenditures	11,172,431	
Donor programmes	411,7260	
Grand total	11,584,157	

Detailed data concerning expenditures and on NPS staff positions are provided in the Tables on the following pages.

Table 3.5: Operating expenditures for 2007 in international dollars [(a)]

<table>
<tr><th rowspan="2"></th><th colspan="4">Central level</th><th colspan="2">Sub-national level</th><th colspan="3"></th></tr>
<tr><th>SENASA - Central Veterinary Units</th><th>SENASA - Veterinary Laboratory (national and sub-national)</th><th>SENASA - Border inspection and quarantine</th><th>Veterinary Statutory Body</th><th>SENASA Sub-national operations</th><th>Munici-palities</th><th>Total public expenditures VS [(b)]</th><th>Donor programmes</th><th>Total public expenditures VS (including donor progr.)</th></tr>
<tr><td>Staff costs (including wages, social contributions and non-wage income, i.e. in-kind payments)</td><td>2,772,990</td><td>860,673</td><td>2,016,232</td><td>125,656</td><td>2,424,312</td><td>0</td><td>8,199,864</td><td rowspan="7">411,726</td><td rowspan="7">11,584,157</td></tr>
<tr><td>Material supplies (e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)</td><td>237,132</td><td>617,884</td><td>53,934</td><td rowspan="5">315,839</td><td>157,363</td><td>0</td><td>1,066,314</td></tr>
<tr><td>Services (e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)</td><td>33,900</td><td>2,546</td><td>6,792</td><td>3,668</td><td>0</td><td>46,906</td></tr>
<tr><td>Consumption of fixed capital (reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.) [(c)]</td><td>77,585</td><td>380,560</td><td>59,374</td><td>67,357</td><td>0</td><td>584,876</td></tr>
<tr><td>Compensation of livestock holders (for animals culled for disease control purposes)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Other current expenditures (e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)</td><td>709,543</td><td>41,138</td><td>118,604</td><td>89,348</td><td>0</td><td>958,632</td></tr>
<tr><td>Total operational expenditure</td><td>3,831,149</td><td>1,902,802</td><td>2,195,563</td><td>441,495</td><td>2,742,048</td><td>0</td><td>11,172,431</td></tr>
</table>

Notes:

(a) Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided. The shares of expenditures related to the NPS are estimated using staff data.

(b) In this column, total public expenditures VS related to material supplies, services, consumption of fixed capital, compensation of livestock holders and other current expenditures do not include the 315,839 international dollars of the Veterinary Statutory Body.

(c) No data on consumption of fixed capital directly available. Consumption of fixed capital calculated on basis of inventory of equipments and buildings, and estimates of useful lives and replacement costs Buildings are assumed to be fully depreciated. The depreciation of laboratories is assumed to represent 20% of their respective total operating expenditures based on typical values from sample of institutions

Table 3.6: Number of staff positions National Prevention System by category in 2007

	Central level				*Sub-national level*		*Total*
	SENASA - Central Veterinary Units	**SENASA - Veterinary Laboratory (national and sub-national)**	**SENASA - Border inspection and quarantine**	**Veterinary Statutory Body**	**SENASA Sub-national operations**	**Municipalities**	
Veterinarians/ Graduate personnel (non veterinary)	49	9	20	4	37	0	***117*** [(a)]
Veterinary paraprofessional / veterinary technicians	29	14	40	0	31	0	***114***
Support personnel (not included in total)	18	9	14	7	12	0	***60***
Total *(graduate and veterinary staff members)*	**78**	**23**	**60**	**4**	**68**	**0**	***231***

Notes:
(a) Includes approximately 2 graduates personnel

Table 3.7: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Average national and sub-national level SENASA	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	643,436	2,185
Graduate personnel (non veterinary)	534,543	1,815
Veterinary paraprofessional / veterinary technicians	275,952	937
Support personnel	174,518	593

3.1.5. Analysis and discussion of findings

3.1.5.1. NPS expenditures in relation to national budget

Costa Rica's total public operating expenditures for the NPS (thereafter referred to as operating expenditures) amounted to 8.18 international dollars per VLU, which represents 0.02% of the GDP and 0.27% of the AGDP. The agricultural sector contributed 9% to the GDP of the country which explains the relatively high difference between the total expenditures as a percentage of the GDP and the AGDP.

In addition to the 8.18 international dollars per VLU, 4% were contributed by donor programmes resulting in a total amount of 8.49 international dollars per VLU available for operating expenditures. All figures in the following chapters are presented excluding donor figures.

0.17% of the total national budget was spent on the operating expenditures of the NPS.

3.1.5.2. Budget allocation

Budget allocation to central and sub national level

Expenditures at the central level accounted with 75% (6.18 international dollars per VLU) for the majority of the total public operating expenditures. 38% of those went to the Central Veterinary Unit of SENASA, 20% to SENASA's Border Inspection Posts and 17% to the Veterinary Laboratory operated by SENASA.

With 20% Border Inspection Post take up a relatively high percentage of the total public expenditures.

The remaining 25% of the total operating expenditures were consumed by the sub national operations of SENASA.

Staff costs

Staff costs represented with 73% the majority of the total public expenditures. The majority (70%) of the 6.00 international dollars per VLU for staff costs was available to the central level. This is not surprising as the majority of staff (73%) is employed at central level with the Central Veterinary Units as the main employer with 33% of the staff and 34% of the total staff expenses and the Border Inspection posts with 25% of the staff and 25% of the total staff expenses. The employees at sub national level amount to 80 members of staff which represents 27% of the total number of employees.

On average a public veterinarian NPS cares for 11,648 VLUs.

Material and supplies

10% of the total operating expenditures for the NPS were disbursed for material and supplies. SENASA does not provide farmers with free of charge or subsidies vaccines nor is the vaccination process free of charge for farmers. Costs for vaccines amounted to only 0.21% (0.02 international dollars per VLU) of the total public expenditures.

Services

Services include fees for communications, training of staff and, if subcontracted, laboratory diagnosis. A negligible 0.03 international dollars per VLU were spent on those with expenses at central level accounting for 92%.

Consumption of fixed capital

Fixed assets are mainly present at central level with depreciation accounting for 5% (0.4 international dollars per VLU) of the total operating expenditures.

Compensation of livestock holders

No compensation for animals culled due to disease control measures were paid to livestock owners.

Other current expenditures

9% of the total operating expenditures were used to finance travel expenses, per diems and other expenses not falling under the previous sections. 91% were again accounted for at central level with SENASAs Central Veterinary Units (74%) and Border Inspection Posts (12%).

3.1.5.3. Comparison with other countries

Costa Rica is with 51,100 km^2 the smallest country in the sample and has a very short land border (639 km).

Costa Rica is the only country with Romania in the sample that is recognized by the OIE as "*FMD free without vaccination*".[87]

Compared to the other countries in the sample the Costa Rican NPS shows with Uganda the highest degree of centralisation of expenditures. Regarding expenditures Costa Rica spends the smallest proportion of the operating expenditures on vaccines (0.21%) and followed by Turkey the largest percentage on staff costs (73%). Only Turkey allocated less funds (2%) to materials and supplies compared to 10% for Costa Rica.

[87] OIE 2009. List of Foot and Mouth Disease Free Member. Available at: http://www.oie.int/Eng/info/en_fmd.htm Accessed: 01.03.2009.

Table 3.8: Indicators related to NPS operating expenditures and staff

Indicators	
Indicators related to operating expenditures	
Total public operating expenditures/Veterinary Livestock Unit	8.18 intl. $
Total public operating expenditures including donor programmes/Veterinary Livestock Unit	8.49 intl. $
Total public operating expenditures/GDP	0.02%
Total public operating expenditures including donor programmes/GDP	0.03%
Total public operating expenditures/AGDP	0.27%
Total public operating expenditures including donor programmes/AGDP	0.28%
Donor programmes VS/Total public operating expenditures including donor programmes	4%
Staff costs/Total public operating expenditures	73%
Non staff operating expenditures/Total public operating expenditures	24%
Non-staff operating expenditures/Veterinary personnel	11,479 intl. $
Non-staff operating expenditure/Veterinary Livestock Unit	1.95 intl. $
Total operating expenditures at central level as percentage of total	75.5%
Total public operating expenditures/National budget	0.17%
Total public operating expenditures including donor programmes/National budget	0.18%
Vaccine cost/Total public operating expenditures	0.21%
Indicators related to staff	
Number of public veterinary paraprofessional NPS/Number of public veterinarians NPS	1
Number of public veterinarians NPS/Number of private veterinarians NPS	1.26
VLU/Number of public veterinarians NPS	11,648

3.2. Kyrgyzstan

3.2.1. Country characteristics

Kyrgyzstan is a landlocked country located in Central Asia with a population slightly over 5 million and a land area of 199,900 km². Kyrgyzstan has international borders with China to the east, Tajikistan to the southwest, Uzbekistan to the west and Kazakhstan to the north and shares 3,051 km of borders.

According to the World Bank categorisation, Kyrgyzstan is a low-income country, with a GNI per capita amounting to 1,950 international dollars in 2007. Approximately a fifth of the total Kyrgyz economically active population work in the agricultural sector, which accounts for 33% of the total Gross Domestic Product (GDP). In 2007, livestock population amounted to 1.8 million Veterinary Livestock Units (VLU).

Table 3.9: Country characteristics

Country characteristics	
General country data	
Land area [(a)]	199,900 km²
Total human population (2007) [(a)]	5.3 million
Agricultural population (2004) [(b)]	1.2 million
Economically active population in agriculture as share of total economically active population (2004) [(b)]	23%
Human development index value (2005) [(c)]	0.696
Gross Domestic Product, (billions of international dollars, 2009) [(a)]	10.51
GNI per capita, PPP (current international dollar, 2007) [(a)]	1,950
Agricultural GDP as share of total GDP (2006) [(a)]	33%
National budget expenditures (billions of international dollars, 2007) [(d)]	2.565
Livestock structure and type of production	
Livestock population (2007) [(e)]	Bovine: 1.1 million; Sheep: 3.2 million; Goats: 0.85 million; Pigs: 0.08 million; Poultry: 4.7 million ; Horses: 0.35 million; Rabbits: 0.65 million
Livestock population in VLU (2007) [(f)]	1.8 million
Livestock production system [(g)]	The economy of Kyrgyzstan is predominantly rural. The livestock sector is one of the strongest components of the rural economy. The collapse of the Soviet Union has brought major transformations in the agricultural sector, particularly in livestock ownership and production systems. Under the Soviet system livestock belonged almost exclusively to the State. When Kyrgyzstan gained its independence, collective and state-farms have been dissolved and state-owned flocks divided and privatised. This coincided with a discontinuation in the operation of most large intensive

	livestock units, whether dairy, beef or poultry. Today, livestock ownership is concentrated in small-scale farms (household plots and private farmers).[88] The practice of transhumance herding has declined, resulting in under-stocked remote pastures and over-stocked more accessible pastures. In autumn 2008, this situation appears to have been aggravated by a serious drought, leading to a shortage in fodder and the perspective of a significant crisis of the livestock sector. 30% of the land area is defined by grassland-based systems and 47% is characterised by mixed farming systems.
Type of eco-system	
Description of eco-system [(h)]	Kyrgyzstan is almost entirely mountainous with only 7% of the land area suitable for arable agriculture. The country is dominated by the Tien Shan mountains that divide the country into three main zones: the northern zone, the southern zone and the central zone. 94% of the Republic is above 1,000 meters, with an average altitude of 2,750 meters and more than 40% over 3,000 meters of which three quarters are under permanent snow and ice. The climate is continental with cold winters and hot summers, but with great local variations depending on altitude. Precipitations are the highest in the high mountains, falling mainly as snow, and vary across ecosystems, ranging annually from 200 mm and 600 mm.
Indicators for livestock production	
Livestock products as share of agricultural exports (in value) (2005) [(i)]	In 2005, Kyrgyzstan exported livestock products amounting to a total value of 14,138,000 USD, which corresponds to 15% of the total of agricultural exports for that year.
Net exports as a percentage of livestock production (in quantity) (2005; 2007) [(i)]	Kyrgyzstan is a net exporter of milk (2.29% of its domestic production).
Net imports as a percentage of domestic consumption of livestock products (in quantity) (2005; 2007) [(i)]	Kyrgyzstan imports 68.24% of its domestic consumption of poultry and 5.53% of its domestic consumption of pigs.

Notes:

(a) World Development Indicators database, retrieved from web.worldbank.org and International Monetary Fund, World Economic Outlook Database, October 2008

(b) FAO Statistical Yearbook 2005-2006, retrieved from http://www.fao.org

(c) Based on figures from Human Development Report 2007/2008 (UNDP). Retrieved from http://hdr.undp.org/en/media/HDR_20072008_EN_Indicator_tables.pdf

(d) Calculations by Civic Consulting based on data from The World Factbook (2007), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/download/download-2007/index.html

(e) FAOSTAT Data, retrieved from http://faostat.fao.org

(f) Calculated on the basis of FAOSTAT livestock numbers and VLU coefficients from OIE Guidelines for writing of the OIE-PVS Evaluation report (2008), p.13 (slightly adapted to cover also buffaloes and rabbits).

(g) Livestock production percentages calculated on the basis of FAOSTAT livestock numbers, livestock production structure based on FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org, the World Bank Livestock Sector Review (2007) p. 1 and information collected by the team of Civic Consulting during the field visit in October 2008; data on production system based on Thornton *et al.* (2002) pp. 17-21

(h) Based on CIA The World Factbook (2008), retrieved from https://www.cia.gov/library/publications/the-world-factbook/ and on FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org

(i) FAO Trade Data, retrieved from http://faostat.fao.org. Import and export data are from 2005, production data are from 2007, while consumption data are calculated on the basis of the above-mentioned data sets.

[88] More than 96% of cattle and sheep, 97% of horses and 85% of poultry are owned by small-scale farmers, The 2007 World Bank Livestock Sector Review.

3.2.2. Animal health situation

In 2007, the total number of outbreaks reported to the OIE was 8 (5 outbreaks of Anthrax and 3 outbreaks of FMD). The main disease prevention measures undertaken in 2007 were targeted at 6 priority diseases.

Table 3.10: Animal Health Situation

Animal Health Situation	
Animal disease outbreaks (2007) [(a)]	The total number of outbreaks reported to the OIE was 8: Anthrax (5); and FMD (3).
Notifiable diseases and diseases for which measures were taken in 2007 [(a)]	A total of 25 officially notifiable diseases were listed as being present in the country in 2007. Measures taken in 2007 included: vaccination programmes against priority diseases, namely, Brucellosis, FMD, Anthrax, Sheep pox, Rabies, and PPR.

Notes:
(a) OIE WAHID, data from 2007 and data collected by the team of Civic Consulting during field visit in 2008.

An overview of the animal health situation in the country is presented in Annex 5.

3.2.3. Main functional units of the NPS

In Kyrgyzstan, the main functional units of the NPS are under the authority of the Ministry of Agriculture, Water Resources and Processing Industry. At central level, the main functional units of the NPS are the Central Veterinary Authority (State Veterinary Department, SVD), the Border Inspection and the Central Veterinary Laboratory. At sub-national level, the main functional units include sub-national veterinary laboratories, sub-national Veterinary Services and municipal veterinary units.

The most frequent PVS level in the OIE PVS Evaluation of 2007 is 1. Detailed results of this Evaluation are presented on the following page.

Table 3.11: Main functional units of the National Prevention System

Main functional units of the National Prevention System for animal diseases and zoonoses	
Organisational structure of the National Prevention System	
Structure of the NPS	The State Veterinary Department (SVD) is part of the Ministry of Agriculture, Water Resources and Processing Industry. The SVD at central level was recently restructured (2008), a coherent structure is set up through the inclusion of the Epidemiological Centre and the integration of the Veterinary Militia (responsible for border inspection towards CIS countries). The number of the staff employed at the Central Veterinary Authority has not changed significantly in the reorganisation process, though a new unit for communication was established in 2008 through the reallocation of the staff employed. The most significant change reported was the increases of salaries of the staff at the Veterinary Authority by the factor 3. Under the SVD, there are seven zonal departments of animal health control and 40 *rayon* (district) state veterinary sub-departments. Besides the Republican Centre of Veterinary Diagnosis (the State Central Laboratory), there are 6 zonal laboratories located in the capitals of the *oblast* (provinces) and small laboratories at rayon level (in total 20).
Challenges for VS of the NPS	Lack of specialist veterinarians, equipment, and means of transport.
OIE PVS Evaluation of the Veterinary Services (VS)	
Most frequent PVS level	1
Veterinary personnel relevant for NPS	
A. Public veterinarians at central level NPS	241
B. Public veterinarians at sub-national level NPS	855
C. Total public veterinarians NPS (sum A+B)	1096
D. Distribution of public veterinary personnel NPS (2007)	Veterinarians: 1096 Graduate personnel (non veterinary): 53 Veterinary paraprofessionals/technicians: 231 Support personnel: 74
E. Private veterinarians conducting public service missions (in the framework of the NPS)	0 (however, private veterinarians apply vaccines provided for free by the government, and charge livestock owners a fee. The number of private veterinarians in this task is not known)
F. Total number of private veterinarians	748

3.2.4. Costs of the NPS

The total public operating expenditures for the National Prevention System of Kyrgyzstan are 10,0 million international dollars (excluding donor contributions). 77% of total operating expenditures for the NPS are disbursed at sub-national level, however, this figure includes the significant amount used for purchase of vaccines (28% of the total operating expenditures). Border inspections constitute 10% of total operating expenditures and donor programmes represent 13% of total operating expenditures in Kyrgyzstan.

Table 3.12: Operating expenditures for 2007 in international dollars by main functional units

Main functional units	Operating expenditures	Comments
Central Level		
Central public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	289,289	
Border inspections	1,017,633	
National veterinary laboratory/ies	989,202	
Sub-national		
Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	6,301,978	Figure include municipalities - no separate data available for municipalities
Municipal veterinary departments	-	
Sub-national veterinary laboratories	1,444,587	
Total public expenditures	10,042,688	
Donor programmes	1,474,494	
Grand total	11,517,181	

Detailed data concerning expenditures and on NPS staff positions are provided in the Tables on the following pages.

Table 3.13: Operating expenditures for 2007 in international dollars [(a)]

<table>
<tr><th rowspan="2"></th><th colspan="3">Central level</th><th colspan="3">Sub-national level</th><th colspan="3"></th></tr>
<tr><th>Central Veterinary Authority (SVD) [(b)]</th><th>Border inspection</th><th>Central Veterinary Laboratory</th><th>Sub-national veterinary laboratories</th><th>VS sub-national units (excl. muni-cipalities)</th><th>Munici-palities</th><th>Total public expenditures VS</th><th>Donor programmes</th><th>Total public expenditures VS (including donor progr.)</th></tr>
<tr><td>Staff costs (including wages, social contributions and non-wage income, i.e. in-kind payments)</td><td>80,656</td><td>794,473</td><td>190,917</td><td>792,120</td><td>1,546,410</td><td>-</td><td>3,404,576</td><td rowspan="7">1,474,494</td><td rowspan="7">11,517,181</td></tr>
<tr><td>Material supplies (e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)</td><td>20,408</td><td>132,506</td><td>569,915</td><td>166,922</td><td>4,305,647</td><td></td><td>5,195,398</td></tr>
<tr><td>Services (e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>15,039</td><td></td><td>15,039</td></tr>
<tr><td>Consumption of fixed capital (reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)</td><td>129,769</td><td>25,408</td><td>28,490</td><td>419,600</td><td>109,279</td><td></td><td>712,546</td></tr>
<tr><td>Compensation of livestock holders (for animals culled for disease control purposes)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Other current expenditures (e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)</td><td>58,456</td><td>65,246</td><td>199,880</td><td>65,945</td><td>325,603</td><td></td><td>715,129</td></tr>
<tr><td>Total operational expenditure</td><td>289,289</td><td>1,017,633</td><td>989,202</td><td>1,444,587</td><td>6,301,978</td><td>0</td><td>10,042,688</td></tr>
</table>

Notes:
(a) Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided.
(b) 6 staff members of the Central Veterinary Authority are working in the accounting and finance department. Their salaries are excluded from the total of the staff costs. The assumption is that the other costs mainly relate to staff members with veterinary functions and are therefore not adjusted.

Table 3.14: Number of staff positions National Prevention System by category in 2007

	Central level			*Sub-national level*			*Total*
	Central Veterinary Authority (SVD) [(a)]	**Border inspection**	**Central veterinary laboratory**	**Sub-national veterinary laboratories** [(a)]	**VS sub-national units (excl. municipalities)**	**Municipalities** [(b)]	
Veterinarians	25	191	25	160	576	119	***1096***
Graduate personnel (non veterinary)		15	8	30			***53***
Veterinary paraprofessional / veterinary technicians			22	209			***231***
Support personnel (not included in total)			11	63			***74***
Total *(graduate and veterinary staff members)*	***25***	***206***	***55***	***399***	***576***	***119***	***1380***

Notes:
(a) Additional 14 staff members were employed by the Anti-epizootical Division at central level but paid from the sub-national budget.
(b) This figure includes the veterinary staff of 12 smaller municipalities and the cities of Bishkek and Osh, funded by the central government budget. A visit to the Veterinary Department of the Bishkek municipality indicated that the department is much larger than the 17 veterinarians funded from the central government budget. A total staff number of 143 was given. The figure in the table is therefore likely to underestimate the role of municipalities. The large majority of the municipal veterinarians in Bishkek seem to be involved in market inspections and other tasks related to food control, including inspections of carcasses of animals slaughtered in villages and delivered to the municipal markets. Only 23 veterinarians of the department reported to have functions directly related to vaccination and animal health.

Table 3.15: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	4,108	309	2,414	181
Graduate personnel (non veterinary)	2,459	185	2,000	150
Veterinary paraprofessional / veterinary technicians	1,700	128	1,540	116
Support personnel	708	53	667	50

3.2.5. Analysis and discussion of findings

3.2.5.1. NPS expenditures in relation to national budget

In 2007 Kyrgyzstan spent 5.69 international dollars per VLU for the total operating expenditures of the NPS. The total operating expenditures represent 0.10% of the GDP and 0.29% of the AGDP. With 33% of the GDP, the agricultural sector is one of the most important sectors in Kyrgyzstan.

The total public expenditures for the NPS represent 0.39% of the total national budget for the year 2007. Financial contributions by donors represented 13% of the total expenditures for the NPS in 2007 (including donor contributions).

3.2.5.2. Budget allocation

Budget allocation to central and sub national level

This section gives only an overview of the allocation of the budget to central and sub-national level. More detailed description and analysis can be found in the following sub-sections.

The majority (77%) of the total expenses for the NPS were accounted for at sub-national level with the largest share (63%) taken by the sub national units of the Veterinary Services and 14% by the Veterinary Laboratories on sub national level (including expenditures for supply of vaccines). Expenditures on central level were mainly created by the Border Inspection (10%) and the Veterinary Laboratory on central level (10%). Only 3% were consumed by the Central Veterinary Authority.

Staff costs

For staff costs 1.9 international dollars per VLU (34%) of the total public expenditures of the NPS was available to the central level.

The highest expenses for staff were found on sub national level (68%) with the sub national units of the Veterinary Services accounting for 45% and the Veterinary laboratories on sub national level for 23%. At central level the biggest contribution to staff expenditures was made by the Border Inspection with 23%, followed by the Veterinary Laboratories with 6% and 2% for the Central Veterinary Authority.

In line with the numbers presented above was the distribution of staff to the different institutions with the 80% of the staff working at sub national level.

Material and supplies

Over half (52% or 2.9 international dollars per VLU) of the total public expenditures were spent on materials and supplies. The sub national level accounted for 86% of those 2.9 international dollars per VLU, with again the majority spent by the sub national units of the Veterinary Services (83%). 53% of the total amount for material and supplies or 28% of the total operating expenditures was used to purchase vaccines.

Services

A negligible amount (0.009 international dollars per VLU) was spent on services with all of this amount accounted for by the sub national units of the Veterinary Services.

Consumption of fixed capital

Depreciation accounted for 7% or 0.4 international dollars per VLU of the total operating expenditures.

Compensation of livestock holders

No compensation was paid to livestock owners in 2007.

Other current expenditures

Other expenditures like travel expenses and per diems accounted for 7% (0.4 international dollars per VLU) of the operating expenditures. 55% of those expenditures were used at sub national level with the sub national units of the Veterinary Services accounting for 46%.

3.2.5.3. Comparison with other countries

In 2007, Kyrgyzstan did not pay any compensation to livestock holders for animals culled due to disease control measures.

Compared to the other countries Kyrgyzstan has with 1,343 the lowest number of VLUs per veterinary personnel.[89] As there are 0.2 veterinary paraprofessionals NPS per public veterinarian NPS in the country, even the number of VLUs per public veterinarian NPS remains, with 1,612, the lowest in the sample. The country with the second lowest number is Vietnam with 4,092 VLUs per public veterinarian.

Kyrgyzstan spends with 0.39% the highest percentage of its total national budget on operating expenditures of the NPS after Mongolia with 0.65%. However Kyrgyzstan is also the country with the highest occurrence of PVS level 1 in the PVS Evaluation of the OIE.

[89] OIE 2007, Performance, Vision and Strategy. A tool for Governance of Veterinary Services, Kyrgyzstan.

Table 3.16: Indicators related to NPS operating expenditures and staff

Indicators	
Indicators related to operating expenditures for the NPS	
Total public operating expenditures/Veterinary Livestock Unit	5.69 intl. $
Total public operating expenditures including donor programmes/Veterinary Livestock Unit	6.52 intl. $
Total public operating expenditures/GDP	0.10%
Total public operating expenditures including donor programmes/GDP	0.11%
Total public operating expenditures/AGDP	0.29%
Total public operating expenditures including donor programmes/AGDP	0.33%
Donor programmes VS/Total public operating expenditures including donor programmes	13%
Staff costs/Total public operating expenditures	34%
Non staff operating expenditures/Total public operating expenditures	66%
Non-staff operating expenditures/Veterinary personnel	5,002 intl. $
Non-staff operating expenditure/Veterinary Livestock Unit	3.76 intl. $
Total operating expenditures at central level as percentage of total	23%
Total public operating expenditures/National budget	0.39%
Total public operating expenditures including donor programmes/National budget	0.45%
Vaccine cost/Total public operating expenditures	28%
Indicators related to staff data	
Number of public veterinary paraprofessional NPS/Number of public veterinarians NPS	0.2
Number of public veterinarians NPS/Number of private veterinarians NPS	n.a.
VLU/Number of public veterinarians NPS	1,612

3.3. Mongolia

3.3.1. Country characteristics

Mongolia is a country with a small population of 2.6 million for a vast total land area of 1,566,500 km². Mongolia has international borders with Russia to the north and China to the east, south and west.

According to the World Bank categorisation, Mongolia is a lower middle-income country, with a GNI per capita amounting to 3,160 international dollars in 2007. Approximately a fifth of the total Mongolian economically active population work in the agricultural sector, which accounts for 22% of the total Gross Domestic Product (GDP). In 2007, livestock population amounted to 6.4 million Veterinary Livestock Units (VLU).

Table 3.17: Country characteristics

Country characteristics	
General country data	
Land area [(a)]	1,566,500 km²
Total human population (2007) [(a)]	2.6 million
Agricultural population (2004) [(b)]	567,000
Economically active population in agriculture as share of total economically active population (2004) [(b)]	22%
Human development index value (2005) [(c)]	0.700
Gross Domestic Product, (billions of international dollars, 2007) [(a)]	8.43
GNI per capita, PPP (current international dollar, 2007) [(a)]	3,160
Agricultural GDP as share of total GDP (2006) [(a)]	22%
National budget expenditures (billions of international dollars, 2007) [(d)]	3.238
Livestock structure and type of production	
Livestock population (2007) [(e)]	Bovine: 2.17 million; Sheep: 14.82 million; Goats: 15.45 million; Pigs: 0.007 million; Poultry: 0.031 million; Horses: 2.11 million; Camels: 0.254 million
Livestock population in VLU (2007) [(f)]	6.4 million
Livestock production system [(g)]	Mongolia is one of the few truly pastoral countries; its economy depends to a large extent on livestock. Extensive livestock production plays a crucial role in the national economy, consumption and employment. Its cold and arid climate is only suitable for extensive, transhumance grazing. About 80% of the country is extensive grazing exploited by traditional, pastoral methods. The intensive sector, which used to be government-run on state farms, has largely broken down since it could not be based on natural pasture and depended on large external inputs of feed. Some small semi-intensive dairy farms are developing in peri-urban areas. In Mongolia, extensive ruminant production accounts for 100% of the total livestock production while intensive production is negligible.

Type of eco-system	
Description of eco-system [h]	The country is divided into 5 main bio-geographical zones: high mountains (5% of total territory); mountain-taiga (4%); forest mountain and steppe (25%); dry steppe (27%); desert steppe and desert (39%). Precipitation is low. The annual level of precipitation varies according to bio-geographical zones, ranging from 100 mm in the desert to over 300 mm in the northern zone. The country has an extreme continental climate, with extremely long and cold winters and short hot summers.
Indicators for livestock production	
Livestock products as share of agricultural exports (2005, in value) [i]	In 2005, Mongolia exported livestock products amounting to a total value of 8,880,000 USD, which corresponds to 23.5% of the total of agricultural exports for that year.
Net exports as a percentage of livestock production in quantity (2005; 2007) [i]	Mongolia is a net exporter of beef (7.45% of its domestic production).
Net imports as a percentage of domestic consumption of livestock products in quantity (2005; 2007) [i]	Mongolia imports 98.3% of its domestic consumption of poultry, 64.4% of its domestic consumption of eggs, 4.3% of its domestic consumption of pigs and 1.8% of its domestic consumption of milk.

Notes:

(a) World Development Indicators database, retrieved from web.worldbank.org and International Monetary Fund, World Economic Outlook Database, October 2008

(b) FAO Statistical Yearbook 2005-2006, retrieved from http://www.fao.org

(c) Based on figures from Human Development Report 2007/2008 (UNDP). Retrieved from http://hdr.undp.org/en/media/HDR_20072008_EN_Indicator_tables.pdf

(d) Calculations by Civic Consulting based on data from The World Factbook (2007), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/download/download-2007/index.html

(e) FAOSTAT Data, retrieved from http://faostat.fao.org

(f) Calculated on the basis of FAOSTAT livestock numbers and VLU coefficients from OIE Guidelines for writing of the OIE-PVS Evaluation report (2008), p.13 (slightly adapted to cover also buffaloes and rabbits).

(g) Livestock production percentages calculated on the basis of FAOSTAT livestock numbers, livestock production structure based on figures from the OIE-PVS Evaluation of Mongolia (2007) p.10-11 and on FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org, and production systems data based on Thornton *et al.* (2002) pp. 17-21.

(h) Based on The World Factbook (2008), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/cs.html , and on FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org.

(i) FAO Trade Data, retrieved from http://faostat.fao.org. Import and export data are from 2005, production data are from 2007, while consumption data are calculated on the basis of the above-mentioned data sets.

3.3.2. Animal health situation

No data were reported to the OIE concerning the total number of outbreaks, notifiable diseases and diseases for which measures were taken in 2007. In 2007 a total of 16 infectious diseases were referred to as being under the responsibility of the government.

Table 3.18: Animal Health Situation

Animal Health Situation	
Animal disease outbreaks [(a)]	Major outbreaks occurred in 2007: Equine Influenza, and Sheep Pox
Notifiable diseases and diseases for which measures were taken [(a)]	The following diseases are under the government's control: Anthrax, Blackleg / blackquarter, Pasteurellosis (haemorrhagic septicaemia), Enterotoxemia, Rabies (dogs and cats), Corynebacteriosis, Salmonellosis (calves), Strangles (glanders), Listeriosis, Ecthyma, Brucellosis (cattle), Avian influenza, Pasteurellosis in pigs, Sheep pox, Foot and Mouth disease. Vaccination programmes funded by the government included FMD, and Sheep Pox.

Notes:
(a) Data collected by Civic Consulting during field visit (October 2008) and OIE PVS Evaluation Mongolia, April 2007.

An overview of the animal health situation in the country is presented in Annex 5.

3.3.3. Main functional units of the NPS

In Mongolia, the functional units of the NPS are under the authority of mainly two institutions: the State Veterinary Department (SVD) of the Ministry of Food, Agriculture and Light Industry (MFALI), and the State Specialized Inspection Agency (SSIA) under the Prime Ministry. These two institutions constitute the main functional units of the NPS at the central level, besides the Central Veterinary Laboratory. At the sub-national level, the main functional units include *Aimag* (province) Veterinary Departments (including laboratories), *Aimag* Inspection Departments and municipal Veterinary Services (in Ulaanbaatar). At *Aimag* level, Veterinary Services depend on Provincial Departments of Agriculture in terms of administration and financial arrangements, which are under the authority of SVD. At *Soum* (district) level the local Veterinary Services are run by private Veterinary Services units.

The most frequent PVS level in the OIE PVS Evaluation of 2007 is 2. Detailed results of this Evaluation are presented below.

Table 3.19: Main functional units of the National Prevention System

Main functional units of the National Prevention System for animal diseases and zoonoses	
Organisational structure of the National Prevention System	
Structure of the NPS	The structure of the VS in Mongolia is complex. Basically the authority of the national VS in Mongolia is shared between two institutions: o The State Veterinary Department (SVD) of the Ministry of Food, Agriculture and Light Industry (MFALI) is the VS implementing agency. As the staff number is very limited (8 including the Director in 2007), no sub-units exist. o The State Specialized Inspection Agency (SSIA), under the Prime Ministry, is the VS inspection body. The structure of the agency has reportedly been restructured seven times in four years. In 2007, it consisted of 9 inspectorates. The inspectorate within SSIA related to Veterinary Services was the Inspectorate of Agriculture and Border Control. This inspectorate was in turn divided into 2 departments: the Department of Agricultural Inspection and the Department of Border Inspection. Although this structure has changed in the meantime, the main tasks of the SSIA remain the same, namely veterinary border inspection and meat inspection Besides these two major institutions, other public institutions which have important functions within the National Prevention System are: -The National Emergency Management Agency (NEMA) under the responsibility of Deputy Minister, which has a coordinating role on activities in relation with animal health emergency and response; -The State Central Veterinary Laboratory (SCVL), which is responsible for laboratory diagnosis and investigation in relation to disease control, disease surveillance, and residue testing. The Ministry (MFALI) acquires material for the Central Veterinary Laboratory (e.g. diagnostic sets) as compensation for laboratory analyses required by SVD. At the sub-national level, the main functional units include Aimag (province) Veterinary Departments (including laboratories), Aimag Inspection Departments and municipal Veterinary Services (in Ulaanbaatar). At Aimag level, Veterinary Services depend on Provincial Departments of Agriculture in terms of administration and financial arrangements, which are under the authority of SVD. At Soum (district) level the local Veterinary Services are run by private Veterinary Services units.
Challenges for VS	Frequent and ongoing restructuring of the institutional bodies responsible

	for the NPS. Fragmentation of relevant institutions: There is no single or unified coordinating body responsible for the main veterinary activities, both at central and sub-national level. Budget fluctuations as a consequence of vulnerable national economy. Lack of traceability system.
OIE PVS Evaluation of the Veterinary Services	
Most frequent PVS level	2
Veterinary personnel relevant for NPS	
A. Public veterinarians at central level NPS	130
B. Public veterinarians at sub-national level NPS	320
C. Total public veterinarians NPS (A+B)	450
D. Distribution of public veterinary personnel NPS (2007)	Veterinarians: 450 Veterinary paraprofessionals/technicians: 4 Support personnel: 81
E. Private veterinarians conducting public service missions (in the framework of the NPS)	561
F. Total number of private veterinarians	Approximately similar to the previous figure (561)

3.3.4. Costs of the NPS

The total public operating expenditures for the National Prevention System is 21.1 million international dollars (excluding donor programmes). 2% of total operating expenditures are allocated to the central laboratory. Donor programmes constitute a minor part of the total operating expenditures (2.8%).

Table 3.20: Operating expenditures for 2007 in international dollars by main functional units

Main functional units	Operating expenditures	Comments
Central Level		
Central public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	10,570,825	
Border inspections and quarantine	934,723	
National veterinary laboratory/ies	506,991	
Sub-national		
Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	8,269,473	Includes Aimag veterinary departments (excluding UB) and SSIA Aimag and Soum inspection departments.
Municipal veterinary departments	803,746	Veterinary departments of the Municipality of Ulaanbaatar.
Sub-national veterinary laboratories	-	
Total public expenditures	21,085,759	
Donor programmes	616,509	
Grand total	21,702,267	

Detailed data concerning expenditures and on NPS staff positions are provided in the Tables on the following pages.

Table 3.21: Operating expenditures for 2007 in international dollars

	Central level					*Sub-national level*					
	State Veterinary Department	**SSIA (meat inspection)**	**SSIA (border inspection)**	**NEMA**	**Central Veterinary Laboratory**	***Aimag* veterinary departments (excluding UB)** [b]	**Veterinary departments of the Municipality of UB**	**SSIA *Aimag* and *Soum* inspection departments** [b]	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (incl. donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	55,729	103,280	582,408	23,296	184,390	1,420,778	109,873	1,528,238	4,007,993		
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	8,470,768	7,358	40,214	1,331	158,905	1,709,188	404,102	141,875	10,933,740		
Services *(e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	1,627,920	n.a.	0	n.a.	0	2,817,219	246,307	n.a.	4,691,445		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)*	12,349	7,985	45,634	1,261	137,616	379,683	7,973	0	592,500	616,509	21,702,267
Compensation of livestock holders *(for animals culled for disease control purposes)*	141,275	0	0	0	0	0	0	0	141,275		
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc).* [c]	105,164	11,778	266,468	1,331	26,080	164,398	35,492	108,095	718,804		
Total operational expenditure	10,413,205	130,401	934,723	27,220	506,991	6,111,582	803,746	1,778,208	21,085,759		

Notes:
(a) No budget data available for sub-national institutions, expect for veterinary departments of the Municipality of Ulaanbaatar. Expenditures for *Aimag* veterinary departments and SSIA *Aimag* and *Soum* inspection departments are based on budget data collected by the evaluation team during the field visit and extrapolated on basis of staff data.
(b) No budget data on consumption of fixed capital directly available, except for the Central Veterinary Laboratory. This is calculated on basis of inventory of equipments and buildings, and estimates of useful lives and replacement costs.

Table 3.22: Number of staff positions National Prevention System by category in 2007

	Central level				*Sub-national level*			*Total*
	State Veterinary Department	**SSIA (meat inspection)**	**SSIA (border inspection)**	**Central veterinary laboratory**	***Aimag* veterinary departments (excluding UB)**	**Veterinary departments of the Municipality of UB**	**SSIA *Aimag* and *Soum* inspection departments**	
Veterinarians	8	19	75	28	152	152	16	***450***
Graduate personnel (non veterinary)				8		196	3	***207***
Veterinary paraprofessional / veterinary technicians					3		1	***4***
Support personnel (not included in total)				15	58		8	***81***
Total *(graduate and veterinary staff members)*	***8***	***19***	***75***	***36***	***155***	***348***	***20***	***661***

Table 3.23: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	337,992	625	222,901	412
Graduate personnel (non veterinary)				No consistent data available
Veterinary paraprofessional / veterinary technicians				No consistent data available
Support personnel				No consistent data available

3.3.5. Analysis and discussion of findings

3.3.5.1. NPS expenditures in relation to national budget

In 2007, Mongolia's total public operating expenditures for the NPS amounted to 3.30 international dollars per VLU, which represents 0.25% of the GDP and 1.14% of the AGDP. The total public operating expenditures represent 0.65% of the total national budget.

Additionally to the total public operating expenditures of the NPS donor programmes contributed 3% of the operating expenditures.

Agriculture contributes 22% to the GDP and the livestock sector is with 87% the most important agricultural sector in Mongolia.[90]

3.3.5.2. Budget allocation

Budget allocation to central and sub national level

This section gives only an overview of the allocation of the budget to central and sub-national level. More detailed description and analysis can be found in the following sub sections.

Altogether 57% of the total public expenditures were spent at central level: half of this (49%) were allocated to the State Veterinary Department, 4% to the SSIA (Border Control), 2% to the Central Veterinary Laboratory and 1% to the Meat Inspection of the SSIA.

43% were designated to the sub-national level with the largest share accounted for by the *Aimag* Veterinary Department with 31% followed by the SSIA *Aimag* and *Soum* Inspection Departments with 8% and the Veterinary Department of the Municipality of Ulaanbaatar with 4%.

Staff costs

Staff costs represents with 19% a very small percentage of the total public operating expenditures of the National Prevention System. The majority (81%) of the available funds were spent at sub national level. Of the funds allocated to the central level 15% were used by the section of the SSIA for Border Inspections, 5% by the Central Veterinary laboratory, 3% for the section Meat Inspection of the SSIA and only 1% was left for the State Veterinary Department and 1% for the National Emergency Management Agency.

Likewise looks the distribution of staff between the central and sub national level. The State Veterinary Department spent with 1% the smallest amount of staff costs and has also the smallest number of employees. Only 8 staff were employed by the SVD in 2007, which is the implementing body of the NPS and is sharing the authority with the SSIA. 94 members of staff (13%) were employed by the SSIA with the Meat Inspection unit accounting for 19 (3%) and the Border Inspection unit for 75 (10%) employees. The Central Veterinary Laboratory employed 51 people, 7% of the total employees.

The majority of the staff (79%) was employed at sub national level with 348 (47%) staff members employed by the SSIA *Aimag* and *Soum* Inspection Departments, 213 (29%) by the *Aimag* Veterinary Departments and 28 (4%) by the Veterinary Department of the Municipalities of Ulaanbaatar.

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[90] Farmers Knowledge Association.2007. Information on Mongolian agriculture. Available at: http://www.owc.org.mn/fermerdem/english/agriculturee.html, Updated: 06.02.2007, Accessed: 19.02.2009.

Material and supplies

Over half (52%, 1.71 international dollars per VLU) of the total operating expenditures were used for the purchase of materials and supplies such as veterinary drugs, vaccines, stationary and fuel for vehicles. The majority of those supplies were purchased by the State Veterinary Department with 77% of all available funds for materials and supplies. The Central Veterinary Laboratory accounted for 1%. The remaining 22% were consumed at sub national level.

The majority of the funds for material and supplies were used to purchase vaccines. In total 1.01 international dollars per VLU, which represents 59% of the total expenditures for materials and supplies and 31% of the total public expenditures for the NPS, were spent on vaccines excluding application of the vaccines at farm level as the livestock owner has to pay a fee for the services.

Services

Judging from the data the Mongolian Veterinary Services spent a considerable proportion (22%) on services.

65% of the funds for services were spent by the sub national level for private Veterinary Services units at *Soum* level. 35% were spent by the State Veterinary Department at central level.

Consumption of fixed capital

Depreciation amounted to 3% (0.09 international dollars per VLU) of the total public operating expenditures. 64% of those were accounted for by the *Aimag* veterinary departments and 23% by the Central Veterinary Laboratory.

Compensation of livestock holders

The Mongolian NPS paid with 1% (0.02 international dollar/ VLU) a very small proportion of the total public expenditures to livestock owners as compensation.

Other current expenditures

Other expenditures like travel expenses and per diems amounted to 3% (0.11 international dollar/ VLU) of the total public operating expenditures. 43% were spent at sub national level and 57% at central level with 37% for the section Border Inspection of the SSIA and 15% of the State Veterinary Department.

3.3.5.3. Comparison with other countries

Mongolia is with 1,566,500 km^2 the largest country with the longest land border (with Russia and China, 8,220 km) in the sample countries which makes it difficult to control informal cross border trade of livestock and livestock products. It also is the country with the lowest livestock population density of 4 VLUs/km^2 and also the lowest human population density with 1.7 people/km^2. Due to the very low density of the livestock and human population and the nature of the Mongolian livestock production system veterinarians have to cover large distances in order to reach livestock owners.

Compared to other countries Mongolia comprises of an extreme continental climate with long, very cold winters and short, hot summers.

Due to the climate Mongolia's agricultural sector is heavily dependent on livestock production which contributes in total 87% to the AGDP.[91] This high importance of the livestock sector is compared to other countries in the sample to an extent reflected by the, with 1.14% of the AGDP and 0.65% of the total national budget, high total public operating expenditures of the NPS.

Even though the total operating expenditures are comparably high, staff costs are the lowest in relative terms (19% of total operating expenditures) in the sample. The low expenditures for staffing are due to the very low level of staffing at central Veterinary Authority, which is also the lowest compared to other countries. A small percentage of the total operating expenditures were paid to livestock owners as compensation for livestock culled due to disease control measures. Even though it was a small percentage (1%) it was more than what the majority of countries paid to livestock owners. Additionally the Mongolian NPS supported livestock owners by providing them with vaccines free of charge. Expenditures for vaccines took up 31% of the total operating expenditures which is the largest proportion of operating expenditures spent on vaccines after Uganda (55%).

Compared to the other countries in the sample the Mongolian NPS comprises of the highest degree of privatization at the local level (*Soum*).

[91] See footnote 90.

Table 3.24:Indicators related to NPS operating expenditures and staff

Indicators	
Indicators related to operating expenditures	
Total public operating expenditures/Veterinary Livestock Unit	3.30 intl. $
Total public operating expenditures including donor programmes/Veterinary Livestock Unit	3.40 intl. $
Total public operating expenditures/GDP	0.25%
Total public operating expenditures including donor programmes/GDP	0.26%
Total public operating expenditures/AGDP	1.14%
Total public operating expenditures including donor programmes/AGDP	1.17%
Donor programmes VS/Total public operating expenditures including donor programmes	3%
Staff costs/Total public operating expenditures	19%
Non staff operating expenditures/Total public operating expenditures	81%
Non-staff operating expenditures/Veterinary personnel	25,836 intl. $
Non-staff operating expenditure/Veterinary Livestock Unit	2.68 intl. $
Total operating expenditures at central level as percentage of total	57%
Total public operating expenditures/National budget	0.65%
Total public operating expenditures including donor programmes/National budget	0.67%
Vaccine cost/Total public operating expenditures	31%
Indicators related to staff	
Number of public veterinary paraprofessional NPS/Number of public veterinarians NPS	0.009
Number of public veterinarians NPS/Number of private veterinarians NPS	0.80
VLU/Number of public veterinarians NPS	4,179

3.4. Morocco

3.4.1. Country characteristics

Morocco is a country located in North Africa with a population of nearly 31 million and a land area of 446,550 km². Morocco has international borders with Algeria to the east, Mauritania to the south and is bordered to the North by the Strait of Gibraltar, a water border with Spain. It has a coast on the Atlantic Ocean and on the Mediterranean Sea. Morocco has the widest plains, which constitutes the backbone for agriculture, and the highest mountains in North Africa.

According to the World Bank categorisation, Morocco is a lower middle-income country, with a GNI per capita amounting to 3,990 international dollars in 2007. Approximately a third of the total Moroccan economically active population work in the agricultural sector, which accounts for 12% of the total Gross Domestic Product (GDP). In 2007, livestock population amounted to 6.5 million Veterinary Livestock Units (VLU).

Table 3.25: Country characteristics

Country characteristics	
General country data	
Land area [(a)]	446,550 km²
Total human population (2007) [(a)]	30.9 million
Agricultural population (2004) [(b)]	10.4 million
Economically active population in agriculture as share of total economically active population (2004) [(b)]	33%
Human development index value (2005) [(c)]	0.646
Gross Domestic Product, (billions of international dollars, 2007) [(a)]	126.94
GNI per capita, PPP (current international dollar, 2007) [(a)]	3,990
Agricultural GDP as share of total GDP (2007) [(a)]	12%
National budget expenditures (billions of international dollars, 2007) [(d)]	35.191
Livestock structure and type of production	
Livestock population (2007) [(e)]	Bovine: 2.7 million; Sheep: 17.3 million; Goats: 5.3 million; Pigs: 0.008 million; Poultry: 140 million; Horses: 0.16 million; Camels: 0.036 million
Livestock population in VLU (2007) [(f)]	6.45 million
Livestock production system [(g)]	In Morocco, extensive ruminant production accounts for 78% of the total livestock production while intensive production constitutes 22%. The feed resources, their amount, quality, and seasonal availability determine which animal production system predominates. 7% of the land area is defined by grassland-based systems and 25% is characterised by mixed farming systems.

Type of eco-system	
Description of eco-system (h)	Morocco is dominated by the Mediterranean climate as rainfall occurs within the cool season, while the warm season is dry. However, the climatic conditions are diverse. Rainfall is variable within seasons and between years. It occurs mostly in autumn, winter and spring. Mean annual rainfall ranges from less than 100 mm (Saharan bio-climate), to 1200 mm (humid bio-climate). Drought is the most important manifestation of such variability. The country is described by four main physiographic regions: o The Rif mountain range, parallel to the Mediterranean coast; o The Atlas Mountains, extending across the country; o A region of broad coastal plains along the Atlantic Ocean; o The plains and valleys south of the Atlas Mountains, which merge with the Sahara along the south-eastern borders of the country.
Indicators for livestock production	
Livestock products as share of agricultural exports (2005, in value) (i)	In 2005, Morocco exported livestock products amounting to a total value of 74,175,000 USD, which corresponds to 11.4% of the total of agricultural exports for that year.
Net exports as a percentage of livestock production in quantity (2005; 2007) (i)	Morocco is not a net exporter of any of its livestock productions (i.e. bovine, sheep, pigs, poultry, milk and eggs).
Net imports as a percentage of domestic consumption of livestock products in quantity (2005; 2007) (i)	Morocco imports 19% its domestic consumption of milk and less than 1% of its domestic consumption of bovine, poultry and sheep (respectively).

Notes:

(a) World Development Indicators database, retrieved from web.worldbank.org and International Monetary Fund, World Economic Outlook Database, October 2008
(b) FAO Statistical Yearbook 2005-2006, retrieved from http://www.fao.org
(c) Based on figures from Human Development Report 2007/2008 (UNDP). Retrieved from http://hdr.undp.org/en/media/HDR_20072008_EN_Indicator_tables.pdf
(d) Calculations by Civic Consulting based on data from The World Factbook (2007), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/download/download-2007/index.html
(e) FAOSTAT Data, retrieved from http://faostat.fao.org
(f) Calculated on the basis of FAOSTAT livestock numbers and VLU coefficients from OIE Guidelines for writing of the OIE-PVS Evaluation report (2008), p.13 (slightly adapted to cover also buffaloes and rabbits).
(g) Livestock production percentages calculated on the basis of FAOSTAT livestock numbers, livestock production structure based on figures from the OIE-PVS Evaluation of Morocco (2007) p.4 and figures from FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org, and production systems data, based on Thornton *et al.* (2002) pp. 17-21.
(h) Based on CIA The World Factbook (2008), retrieved from https://www.cia.gov/library/publications/the-world-factbook/ and on FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org
(i) FAO Trade Data, retrieved from http://faostat.fao.org. Import and export data are from 2005, production data are from 2007, while consumption data are calculated on the basis of the above-mentioned data sets.

3.4.2. Animal health situation

In 2007, the total number of outbreaks reported to the OIE was 1578, of which the most frequent were Bluetongue (1076), Rabies (350), Sheep and Goat Pox (131), Brucellosis Brucella Abortus (16) and Anthrax (5). The main disease prevention programmes undertaken in 2007 were measures against Rabies, Bovine Tuberculosis, Bovine Brucellosis, FMD, Bluetongue, and Infectious Bovine Rhinotracheit (IBR/IPV).

Table 3.26: Animal Health Situation

Animal Health Situation	
Animal disease outbreaks [(a)]	The total number of outbreaks reported to the OIE in 2007 was 1578, of which the most frequent were: Bluetongue (1076), Rabies (350), Sheep and Goat Pox (131), Brucellosis Brucella Abortus (16), and Anthrax (5).
Notifiable diseases and diseases for which measures were taken [(a)]	A total of 7 officially notifiable diseases were present in the country and declared to the OIE in 2007. Measures taken in 2007 were prevention programmes for the following diseases: Rabies, Bovine Tuberculosis, Bovine Brucellosis, Infectious Bovine Rhinotracheit (IBR/IPV), FMD, Sheep and Goat Pox and Bluetongue. A vaccination programme against Anthrax was also implemented in 2007.

Notes:
(a) OIE WAHID data from 2007.

An overview of the animal health situation in the country is presented in Annex 5.

3.4.3. Main functional units of the NPS

In Morocco, the main functional units of the NPS are under the authority of the *Direction de l'Elevage* (Livestock Directorate) of the *Ministère de l'Agriculture, du Développement Rural et des Pêches Maritimes (MADRPM)*. At central level, the main functional units of the NPS are the *Division de la Santé Animale*, *DSA* (Animal Health Division) and the National Laboratory for Epidemiology and Zoonoses (*LNEZ*). At sub-national level, the main functional units include the 41 provincial Veterinary Services, which are part of the *Directions Provinciales de l'Agriculture DPA* (Provincial Directions of Agriculture) and under the technical supervision of the *Direction de l'Elevage* (Livestock Directorate), and the 9 Veterinary Services of the *Offices Régionaux de Mise en Valeur Agricole* (Regional Offices for Agriculture). Other relevant sub-national functional units comprise the 6 Regional Laboratories for Analyses and Veterinary Research (*LRARV*) and the 13 Border Inspection Posts (BIP) under the competency of the *DPA*.

The most frequent PVS level in the OIE PVS Evaluation of 2007 is 3. Detailed results of this Evaluation are presented below.

Table 3.27: Main functional units of the National Prevention System

Main functional units of the National Prevention System for animal diseases and zoonoses	
Organisational structure of the National Prevention System	
Structure of the NPS	The Moroccan VS are under the *Direction de l'Elevage (DE)*, the Livestock Directorate of the *Ministère de l'Agriculture, du Développement Rural et des Pêches Maritimes (MADRPM).* At central level, the *Division de la Santé Animale, DSA* (Animal Health Division) and the National Laboratory for Epidemiology and Zoonoses (*LNEZ*) are the most relevant bodies. At the sub-national level, the structure of the VS according to the territory are: o 41 provincial VS which are part of the Provincial Directions of Agriculture (*Directions Provinciales de l'Agriculture, DPA*), under the technical supervision of the Livestock Directorate (*DE*) and; o 9 VS of *ORMVA*, the Regional Offices for Agriculture. The activities of *ORMVAs* are extending on several provinces. The other sub-national institutions relevant for the VS are: o 6 Regional Laboratories for Analyses and Veterinary Research (*LRARV*); o 13 Border Inspection Posts (BIP) under the competency of Provincial Directions of Agriculture (*DPA)* A restructuring programme is planned for 2009-2010 aiming at a more direct vertical link between the Animal Health Division (*DSA*) and Provincial Directions of Agriculture (*DPAs*) and Regional Offices for Agriculture (*ORMVAs)* and a better allocation of resources to sub-national VS.
Challenges for VS	Limited means of communication in *DPAs*; Limited and often old means of transportation at the disposal of VS (especially at local level); Lack of traceability system; Problem of illegal trade in live animals.
OIE PVS Evaluation of the Veterinary Services	
Most frequent PVS level	3

Veterinary personnel relevant for NPS	
A. Public veterinarians at central level NPS	33
B. Public veterinarians at sub-national level NPS	207
C. Total public veterinarians NPS (A+B)	240
D. Distribution of public veterinary personnel NPS (2007)	Veterinarians: 240 Graduate personnel (non veterinary): 28 Veterinary paraprofessionals/technicians: 639 Support personnel: 187
E. Private veterinarians conducting public service missions (in the framework of the NPS)	424[92]
F. Total number of private veterinarians	Approximately 550

[92] A total of 424 private veterinarians are accredited for public missions (e.g. vaccination campaigns).

3.4.4. Costs of the NPS

In Morocco, 23% of total operating expenditures for the NPS are disbursed at central level (including donor programmes). More than 92% of this amount is dedicated to the purchase of biological, pharmaceutical and chemical products and other materials, which are then allocated to sub-national units. The veterinary inspections at Border Posts are undertaken by veterinarians of the Veterinary Services of the Provincial Directions of Agriculture (*DPAs*).[93]

Table 3.28: Operating expenditures for 2007 in intern. dollars by main functional units

Main functional units	Operating expenditures	Comments
Central Level		
Central public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	10,626,894	More than 92% of this amount is dedicated to the purchase of products and other materials for sub-national units.
Border inspections and quarantine	800,464	This amount refers to the BIPs in Casablanca, Tanger and Agadir only. Expenditures related to border inspections performed by veterinarians of the Veterinary Services of the Provincial Directions of Agriculture (sub-national units) could not be separately identified; and are not included here.
National veterinary laboratory/ies	457,102	The National Laboratory for Epidemiology and Zoonoses is not a laboratory at such. The activities of this functional unit include the coordination of the national epidemiological surveillance network and the monitoring of the national, regional, and international sanitary situation. Sub-national laboratories undertake the veterinary diagnostic activities.
Sub-national		
Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	28,015,281	Veterinary Services of the Provincial Directions of Agriculture perform border inspections.
Municipal veterinary departments	-	Municipal veterinary departments exist in Rabat and Kenitra that perform mainly tasks related to food hygiene.
Sub-national veterinary laboratories	6,911,307	
Total public expenditures	46,811,047	
Donor programmes	1,887,152	
Grand total	48,698,199	

Detailed data concerning expenditures and on NPS staff positions are provided in the Tables on the following pages.

93 In Morocco, there are 16 border inspection posts (BIPs). Among these, 3 are located in the cities of Casablanca, Tanger and Agadir, where the flow of live animals and animal products is of major importance. The VS located at these 3 BIPs fall under the responsibility of the Direction of Control and Quality (DCQs), whereas the remaining 13 BIPs fall under the responsibility of the VS of the Provincial Directions of Agriculture (DPAs).

Table 3.29: Operating expenditures in international dollars [(a)]

	Central level			*Sub national level*					
	Animal Health Division	**National Laboratory for Epidemiology and Zoonoses (*LNEZ*)**	**Border Inspection Posts**[(b)]	**VS of the Provincial Directions of Agriculture (*DPA*)**	**VS of the Regional Offices for Agriculture (*ORMVA*)**	**Regional Laboratories for Analyses and Veterinary Research (*LRARV*)**	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (incl. donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)* [(c)]	717,327	395,121	706,931	13,048,762	3,950,495	3,477,475	22,296,112	1,887,152	48,698,199
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)* [(d)]	9,870,050	10,726	16,187	500,206	520,178	1,713,903	12,631,249		
Services *(e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	-	-	0	3,763,614	2,424,505	-	6,188,119		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)* [(e)]	13,269	15,507	23,402	239,766	244,130	1,382,261	1,918,335		
Compensation of livestock holders *(for animals culled for disease control purposes)*	-	-	0	527,021	958,127	-	1,485,149		
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)*[(f)]	26,249	35,747	53,945	1,417,168	421,308	337,668	2,292,085		
Total operational expenditure	10,626,894	457,102	800,464	19,496,538	8,518,742	6,911,307	46,811,047		

Notes:

(a) Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided.

(b) No budget data are directly available. Staff costs are calculated on basis of staff numbers and average costs per staff category. Other items are calculated on basis of expenditures per graduate and veterinary staff member of the *LNEZ*. Border inspections performed by veterinarians of the VS of the *DPA* could not be separately identified; and are not included here.

(c) No budget data on staff costs available. This is calculated on basis of staff numbers and average costs per staff category.

(d) No budget data directly available for the expenditures related to material supplies for the VS of the *ORMVA*. This figure is calculated on basis of extrapolation of data collected for *ORMVA* - Tadla.

(e) No budget data on consumption of fixed capital directly available. This is calculated on basis of inventory of equipments and buildings, and estimates of useful life and replacement costs, except for laboratories for which the depreciation is assumed to represent 20% of their respective total operating expenditures based on typical values from sample of institutions.

(f) For the central level, assumptions on the expenditures related to utilities are used. Other current expenditures for the VS of the *ORMVA* and the *DPA* are extrapolated using the data collected for *ORMVA*-Tadla, *DPA* in Laayone and in Tanger and staff data.

Table 3.30: Number of staff positions National Prevention System by category in 2007

	Central level			*Sub-national level*			*Total*
	Animal Health Division	**National Laboratory for Epidemiology and Zoonoses (LNEZ)**	**Border Inspection Posts**	**VS of the Provincial Directions of Agriculture (DPA)**	**VS of the Regional Offices for Agricultural Development (ORMVA)**	**Regional Laboratories for Analyses and Veterinary Research (LRARV)**	
Veterinarians	15	3	15	147	29	31	***240***
Graduate personnel (non veterinary)	1	5	2	0	0	20	***28***
Veterinary paraprofessional / veterinary technicians	2	3	0	453	162	19	***639***
Support personnel (not included in total)	4	7	3	123	18	32	***187***
Total *(graduate and veterinary staff members)*	***18***	***11***	***17***	***600***	***191***	***70***	***907***

Table 3.31: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central and sub-national levels [(a)]	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	16,800	3,465
Graduate personnel (non veterinary)	14,000	2,888
Veterinary paraprofessional / veterinary technicians	4,900	1,011
Support personnel	3,500	722

Note:
(a) The interviewees were of the opinion that the distinction between national and sub-national levels for the staff costs was not relevant for Morocco.

3.4.5. Analysis and discussion of findings

3.4.5.1. NPS expenditures in relation to national budget

In 2007 the total public operating expenditures for the NPS in Morocco amounted to 7.25 international dollars per VLU. This represents 0.04 of the GDP and 0.31% of the AGDP. Additionally, the financial contributions provided by donors accounts for 4 % of expenditures. With 12% of GDP agriculture is not of such importance to the Moroccan economy, however, the livestock production is an important agricultural sector and contributes 26% to the AGDP. The total public expenditures for the NPS represent 0,13% of the total national budget.

3.4.5.2. Budget allocation

Budget allocation to central and sub national level

The central level spent with 1.84 international dollars per VLU, a quarter of the total public operating expenditures.

The majority (42%) of expenses at sub national level was consumed by the Veterinary Services of the Provincial Directions of Agriculture *(Directions Provinciales de l'Agriculture, DPA)*, 18% by the Veterinary Services of the Regional Offices for Agriculture (*ORMVAs*) and 15% by the Regional Laboratories (*LRARV*).

Staff costs

47% of all public operating expenditures were used to compensate employees (3.45 international dollars per VLU). 92% of staff expenditures occurred at sub national level with the *DPA* accounting for 59%, *ORMVA* 18% and *LRAR* 16%. This goes in line with the distribution of numbers of staff between the central (5%) and sub national level (95%) and between the different institutions of the NPS.

Material and supplies

27% (1.96 international dollars per VLU) of the public operating expenditures were dedicated to the purchase of materials and supplies such as veterinary drugs, vaccines, and fuel for vehicles. 20% of the total public operating expenditures were used to purchase vaccines. Morocco practices routine vaccination for the following diseases: Rabies, Bovine Tuberculosis, Brucellosis, IBR/IPV, Bluetongue and Sheep and Goat Pox. In addition, a vaccination programme against Anthrax was implemented in 2007.[94]

The Animal Health Division accounted with 78% for the majority of the expenses for material and supplies.

Services

The Moroccan NPS used 13% (0.96 international dollars per VLU) of the total public operating expenditures for the compensation of accredited private veterinarians with public mission, etc. All of those were generated on sub national level with 61% accounted for by the *DPA* and 39% by *ORMVA*.

[94] OIE-WAHID data from 2007.

Consumption of fixed capital

Depreciation accounted for 4% or 0.30 international dollars per VLU of the total public operating expenditures. 97% of those were accounted for at sub national level with a major share (72%) of the Regional Laboratories.

Compensation of livestock holders

In total 3% (0.23 international dollars per VLU) of the operating expenditures were dedicated to compensation of livestock owners for animal culled as a result of disease outbreak. The whole amount was accounted for at sub national level.

Other current expenditures

5% (0.36 international dollars per VLU) of the operating expenditures were accounted for as other expenditures. 97% of which were spent at sub national level. Other expenditures of *DPA* amounted to 62%, *ORMVA* 18% and *LRARV* 15%.

3.4.5.3. Comparison with other countries

Together with Costa Rica, Morocco has the highest frequency of PVS advancement level 3 of all countries in the sample.

In terms of expenditures, Morocco pays, after Turkey, with 3% the highest percentage of the total operating expenditures to livestock owners as compensation for livestock culled in case of a disease outbreak.

As in Vietnam, Moroccan NPS employed a high number of veterinary paraprofessional. The ratio of veterinarians to paraprofessionals is 1:2.66, which is the second highest rate of all countries, after Vietnam, analysed in the framework of this study. Resulting from that, one public veterinarian is on average responsible for 26,894 VLUs and one public veterinary personnel including public veterinarians and paraprofessionals for 7,343 VLUs.

Table 3.32: Indicators related to NPS operating expenditures and staff

Indicators	
Indicators related to operating expenditures	
Total public operating expenditures/Veterinary Livestock Unit	7.25 intl. $
Total public operating expenditures including donor programmes/Veterinary Livestock Unit	7.54 intl. $
Total public operating expenditures/GDP	0.04%
Total public operating expenditures including donor programmes/GDP	0.04%
Total public operating expenditures/AGDP	0.31%
Total public operating expenditures including donor programmes/AGDP	0.32%
Donor programmes VS/Total public operating expenditures including donor programmes	4%
Staff costs/Total public operating expenditures	48%
Non staff operating expenditures/Total public operating expenditures	52%
Non-staff operating expenditures/Veterinary personnel	27,890 intl. $
Non-staff operating expenditure/Veterinary Livestock Unit	3.80 intl. $
Total operating expenditures at central level as percentage of total	25%
Total public operating expenditures/National budget	0.13%
Total public operating expenditures including donor programmes/National budget	0.14%
Vaccine cost/Total public operating expenditures	20%
Indicators related to staff	
Number of public veterinary paraprofessional NPS/Number of public veterinarians NPS	2.7
Number of public veterinarians NPS/Number of private veterinarians NPS	0.6
VLU/Number of public veterinarians NPS	26,894

3.5. Turkey

3.5.1. Country characteristics

Turkey has a total land area of 783,560 km² comprising the peninsula of Asia Minor (Anatolia) and eastern Thrace in south-eastern Europe with a population of nearly 74 million. Turkey has international borders with eight countries: Georgia to the northeast, Armenia, Azerbaijan and Iran to the east, Iraq and Syria to the southeast, Greece to the west and Bulgaria to the northwest. The country is bordered to the North by the Black Sea, to the south by the Mediterranean Sea and to the west by the Aegean Sea. Turkey is characterized by extreme geo-climatic diversity, which enables the production of a wide range of livestock.

According to the World Bank categorisation, Turkey is an upper middle-income country, with a GNI per capita amounting to 12,350 international dollars in 2007. Approximately two fifths of the total Turkish economically active population work in the agricultural sector, which accounts for 9% of the total Gross Domestic Product (GDP). In 2007, livestock population amounted to 17.8 million Veterinary Livestock Units (VLU).

Table 3.33: Country characteristics

Country characteristics	
General country data	
Land area [(a)]	783,560 km²
Total human population (2007) [(a)]	73.89 million
Agricultural population (2004) [(b)]	20.48 million
Economically active population in agriculture as share of total economically active population (2004) [(b)]	43%
Human development index value (2005) [(c)]	0.775
Gross Domestic Product, (billions of international dollars, 2007) [(a)]	885.91
GNI per capita, PPP (current international dollar, 2007) [(a)]	12,350
Agricultural GDP as share of total GDP (2007) [(a)]	9%
National budget expenditures (billions of international dollars, 2007) [(d)]	190.72
Livestock structure and type of production	
Livestock population (2007) [(e)]	Bovine: 10.87 million; Sheep: 25.4 million; Goats: 6.5 million; Pigs: 0.001 million; Poultry: 350,08 million; Horses: 0.20 million; Camels: 0.001 million; Buffaloes: 0.10 million
Livestock population in VLU (2007) [(f)]	17.8 million
Livestock production system [(g)]	In Turkey, extensive ruminant production accounts for 80% of the total livestock production while intensive production constitutes 20%. Traditionally most farmers raise a few cattle, some small ruminants and poultry to meet their domestic needs. Since 1990 the number of small ruminants has decreased, while cattle numbers remained almost stable. This indicates a structural change in the livestock sector through a move to more intensive systems.

Type of eco-system	
Description of eco-system [h]	There are two distinct agro-climatic zones in the country. The Central Anatolian Plateau includes transitional zones and coastal areas. The former have long, cold winters and dry summers with annual rainfall of 250-450 mm. The latter have warmer winters and higher annual rainfall of 600-1000 mm. Turkey is divided into 9 different agricultural zones: Central North, Aegean, Marmara and Thrace, Mediterranean, North East, South East, Black Sea, Central East, Central South.
Indicators for livestock production	
Livestock products as share of agricultural exports (2005, in value) [i]	In 2005, Turkey exported livestock products amounting to a total value of 112,756,000 USD, which corresponds to 2.9% of the total of agricultural exports for that year.
Net exports as a percentage of livestock production in quantity (2005; 2007) [i]	Turkey is a net exporter of poultry and eggs (they amount respectively to 5.03% and 1.27% of its poultry and eggs productions).
Net imports as a percentage of domestic consumption of livestock products in quantity (2005; 2007) [i]	Turkey imports 100% of its domestic consumption of pigs.

Notes:

(a) World Development Indicators database, retrieved from web.worldbank.org and International Monetary Fund, World Economic Outlook Database, October 2008

(b) FAO Statistical Yearbook 2005-2006, retrieved from http://www.fao.org

(c) Based on figures from Human Development Report 2007/2008 (UNDP). Retrieved from http://hdr.undp.org/en/media/HDR_20072008_EN_Indicator_tables.pdf

(d) Calculations by Civic Consulting based on data from The World Factbook (2007), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/download/download-2007/index.html

(e) FAOSTAT Data, retrieved from http://faostat.fao.org

(f) Calculated on the basis of FAOSTAT livestock numbers and VLU coefficients from OIE Guidelines for writing of the OIE-PVS Evaluation report (2008), p.13 (slightly adapted to cover also buffaloes and rabbits).

(g) Livestock production percentages calculated on the basis of FAOSTAT livestock numbers, on FAO Country Pasture Profiles (2006). Retrieved at 10 July, 2008, from: http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Turkey/Turkey.htm . Data on production system based on Thornton *et al.* (2002) pp. 17-21.

(h) Based on Myzrak, G. 1988, Agro-ecological zones of Turkey and their Importance in wheat research in mountainous Areas. ICARDA- Aleppo, Syria in: Regionalisation of the national agricultural research system in Turkey.

(i) FAO Trade Data, retrieved from http://faostat.fao.org. Import and export data are from 2005, production data are from 2007, while consumption data are calculated on the basis of the above-mentioned data sets.

3.5.2. Animal health situation

In 2007, the total number of outbreaks reported to the OIE was 2,665, of which the most frequent were FMD (801), Brucellosis B. Abortus (532), Bovine Tuberculosis (312), Rabies (272), and Brucellosis B. Melitensis (201). The main disease prevention programmes undertaken in 2007 included measures against FMD, Anthrax, Rabies, Brucellosis (Brucella Abortus), Brucellosis (Brucella Melitensis), Bovine Tuberculosis, PPR, Sheep and Goat Pox, HPAI.

Table 3.34: Animal Health Situation

Animal Health Situation	
Animal disease outbreaks [(a)]	The total number of outbreaks reported to the OIE in 2007 was 2,665 of which the most frequent were: FMD (801), Brucellosis B. Abortus (532), Bovine Tuberculosis (312), Rabies (272), and Brucellosis B. Melitensis (201).
Notifiable diseases and diseases for which measures were taken [(b)]	A total of 13 officially notifiable diseases were listed as being present in Turkey. Measures taken in 2007 were against the following diseases: FMD, Anthrax, Rabies, Brucellosis (Brucella Abortus), Brucellosis (Brucella Melitensis), Bovine Tuberculosis, Peste des Petits Ruminants, Sheep and Goat Pox, Highly path. Avian influenza.

Notes:
(a) OIE World Animal Health 2007.
(b) OIE WAHID, data from 2007.

An overview of the animal health situation in the country is presented in Annex 5.

3.5.3. Main functional units of the NPS

In Turkey, the main functional units of the NPS are under the authority of the General Directorate of Protection and Control (*Koruma Kontrol Genel Müdürlügü, KKGM*) of the Ministry of Agriculture and Rural Affairs (MARA). At sub-national level, the main functional units include all sub-national units of the Ministry of Agriculture and Rural Affairs.

The most frequent PVS level in the OIE PVS Evaluation of 2007 is 2. Detailed results of this Evaluation are presented on the following page.

Table 3.35: Main functional units of the National Prevention System

Main functional units of the National Prevention System for animal diseases and zoonoses	
Organisational structure of the National Prevention System	
Structure of the NPS	The Ministry of Agriculture and Rural Affairs (MARA) provides oversight of animal health through central and local units. The majority of animal health policy and centralized oversight is conducted by the General Directorate of Protection and Control (*KKGM*). The *KKGM* is divided into 12 departments with sectional responsibilities. Official Veterinary Services activities are addressed within the departments of: o Animal Health Services; o Animal Movement and Quarantine Services; o Public Health Services; o Food Control Services; o Pesticide, Equipment and Veterinary Medicine Services. In the provinces (81) the MARA is represented by local offices at both provincial and district level. Field activities of the VS are carried out through the auspices of the local provincial governments so that *KKGM* is represented by local MARA offices (Provincial Directorates). VS activities are addressed within the sections Animal Health, Food and Feed Control, Slaughterhouse Services and Control Services.
Challenges for VS	The Database Türk-Vet is partly functioning. Action plan for various diseases are needed.
OIE PVS Evaluation of the Veterinary Services	
Most frequent PVS level	2
Veterinary personnel relevant for NPS	
A. Public veterinarians at central level NPS	91
B. Public veterinarians at sub-national level NPS	2,257
C. Total public veterinarians NPS (A+B)	2,348
D. Distribution of public veterinary personnel NPS (2007)	Veterinarians: 2348 Graduate personnel (non veterinary): n.a. Veterinary paraprofessionals/technicians: 1,751 Support personnel: n.a.
E. Private veterinarians conducting public service missions (in the framework of the NPS)	115
F. Total number of private veterinarians	4904 [a]

Note:
(a) OIE WAHID, data from 2007.

3.5.4. Costs of the NPS

In Turkey, the total public operating expenditures for the NPS is 166,962,379 international dollars (excluding donor programmes). The major part (80%) of operating expenditures occurs at sub-national level.

Table 3.36: Operating expenditures for 2007 in international dollars by main functional units

Main functional units	Operating expenditures	Comments
Central Level		
Central public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	27,633,463	
Border inspections and quarantine	1,819,047	
National veterinary laboratory/ies	3,958,370	
Sub-national		
Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	104,929,350	
Municipal veterinary departments	6,832,338	
Sub-national veterinary laboratories	21,789,811	
Total public expenditures	166,962,379	
Donor programmes	13,118,036	
Grand total	180,080,415	

Detailed data concerning expenditures and on NPS staff positions are provided in the Tables on the following pages.

Table 3.37: Operating expenditures for 2007 in international dollars [(a)]

	Central level			*Sub-national level*					
	General Directorate for Protection and Control (*KKGM*)	**FMD Institute (*Sap Enstitüsü*) [(a)]**	**Border inspection**	**Sub-national units of Ministry (MARA)[(c)]**	**Municipa-lities**	**Regional laboratories [(a)]**	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (incl. donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	1,154,649	3,124,845	1,606,890	94,934,681	6,181,548	16,480,519	123,483,132	13,118,036	180,080,415
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	63,367	9,236	87,294	2,281,500	148,557	552,522	3,142,476		
Services *(e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	4,987,449	3,747	8,767	524,859	34,175	78,133	5,637,130		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)*	1,381,673	791,674	90,952	5,246,468	341,617	4,357,962	12,210,346		
Compensation of livestock holders *(for animals culled for disease control purposes)*	13,161,826	0	0	0	0	0	13,161,826		
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)*	6,884,499	28,868	25,144	1,941,843	126,441	320,675	9,327,469		
Total operational expenditure	27,633,463	3,958,370	1,819,047	104,929,350	6,832,338	21,789,811	166,962,379		

Notes:

(a) Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided. Revolving capital budget not included (i.e. income from economic activities). This is assumed to compensate costs for provision of services to third parties, and therefore only the government budget component has been included.

(b) No budget data on consumption of fixed capital directly available. The depreciation of laboratories is assumed to represent 20% of their total operating expenditures. The depreciation for other institutions is assumed to represent 5% of their respective total operating expenditures based on typical values from sample of institutions.

(c) Extrapolated from budget data on basis of NPS relevant number of staff to total number of provincial staff (veterinarians and veterinary technicians).

Table 3.38: Number of staff positions National Prevention System by category in 2007

	Central level			*Sub-national level*			*Total*
	General Directorate for Protection and Control (KKGM)	**FMD Institute (Sap enstitüsü)**	**Border inspection**	**Sub national units of the Ministry of Agriculture and Rural Affairs**	**Municipalities**	**Regional laboratories**	
Veterinarians	48	24	19	1953	141	163	***2348***
Graduate personnel (non veterinary)	2	n.a.		n.a.		n.a.	***2***
Veterinary paraprofessional / veterinary technicians	0	3	4	1733	n.a.	11	***1751***
Support personnel (not included in total)	n.a.			n.a.			***n.a.***
Total *(graduate and veterinary staff members)*	***50***	***27***	***23***	***3686***	***141***	***174***	***4101***

3.5.5. Analysis and discussion of findings

3.5.5.1. NPS expenditures in relation to national budget

Turkey's total public operating expenditures for the year 2007 amounted to 9.40 international dollars per VLU, which represents 0.02% of the GDP and 0.21% of the AGDP. The operating expenditures had a share of 0.09% of the total national budget.

Additionally to the finances raised by the government donor programmes contributed 7% to the total public operating expenditures.

3.5.5.2. Budget allocation

Budget allocation to central and sub national level

Altogether 80% of the total public operating expenditures were accounted for at sub national level, with the operating expenditures of the Sub-national Units of the Ministry of Agriculture and Rural Affairs (MARA) amounting to 63%. The remaining funds at sub-national level were accounted for by the Regional Laboratories (13%) and the Municipalities (4%).

At central level the majority of the operating expenses were declared by the General Directorate for Protection and Control (KKGM) with 17%.

Staff costs

Staff costs represented with 74% is the largest share of the public operating expenditures for the NPS. The staff expenditures at sub-national level amounted to 95% of the total public operating expenditures for staff costs. 77% of those funds were accounted for by the Sub-national Units of the Ministry of Agriculture and Rural Affairs and 13% by the Regional Laboratories.

Staff numbers show the same distribution as 98% of the staff works at sub-national level. The ratio between veterinary paraprofessionals and veterinarian equals 0.7.

Material and supplies

2% (0.18 international dollars per VLU) of the total public operating expenditures were used to purchase materials and supplies. 96% of the expenditures for materials and supplies were accounted for at sub national level. The expenditures for materials and supplies of Sub-national Units of the Ministry of Agriculture and rural Affairs represented the largest share with 73%, followed by the Regional Laboratories (18%) and the Municipalities (5%).

Services

Services accounted for 3% (0.32 international dollars per VLU) of the total operating expenditures with the *KKGM* at central level taking the largest share of 88%. On sub national level the Sub-national Units of the Ministry of Agriculture and Rural Affairs accounted for 9%.

Consumption of fixed capital

Depreciation accounted for 7% or 0.69 international dollars per VLU of the total public operating expenditures. 81% of those expenses were consumed at sub national level.

Compensation of livestock holders

In Turkey, the NPS paid 8% of the total public operating expenditures to the livestock owners as a compensation for infected animals that had to be culled.

Other current expenditures

Other current expenditures such as travel and per-diem represent 6% of the total operating expenditures. Of those 74% were accounted for by the *KKGM* and the remaining funds at sub national level, with Sub-national Units of the Ministry of Agriculture and Rural Affairs accounting for 21%.

3.5.5.3. Comparison with other countries

Turkey is after Mongolia with 783,560 km² the second largest country in the sample and has a population density of 94.3 people per km.² Livestock population density is relatively low with 23 VLUs per km.²

With 4,334 VLUs per veterinary personnel NPS Turkey has the highest number of veterinary personnel after Vietnam. Looking at the expenditures compared to other countries, the NPS in Turkey allocates the highest percentage of operating expenditures for staff costs (74%). On the other hand the expenditures for material and supplies are with 2% by far the smallest of all sample countries. Costa Rica follows with 10%.

Public operating expenditures for the NPS as a whole are with 9.4 international dollars the highest of all countries analyzed for this study. However the most frequent level of advancement in the PVS analysis is 2. Costa Rica and Morocco recorded less operating expenditures per VLU, but reached a higher advancement level in the OIE PVS analysis.

Table 3.39: Indicators related to NPS operating expenditures and staff

Indicators	
Indicators related to operating expenditures	
Total public operating expenditures/Veterinary Livestock Unit	9.40 intl. $
Total public operating expenditures including donor programmes/Veterinary Livestock Unit	10.14 intl. $
Total public operating expenditures/GDP	0.02%
Total public operating expenditures including donor programmes/GDP	0.02%
Total public operating expenditures/AGDP	0.21%
Total public operating expenditures including donor programmes/AGDP	0.23%
Donor programmes VS/Total public operating expenditures including donor programmes	7%
Staff costs/Total public operating expenditures	74%
Non staff operating expenditures/Total public operating expenditures	26%
Non-staff operating expenditures/Veterinary personnel	10,608 intl. $
Non-staff operating expenditure/Veterinary Livestock Unit	2.45 intl. $
Total operating expenditures at central level as percentage of total	20%
Total public operating expenditures/National budget	0.09%
Total public operating expenditures including donor programmes/National budget	0.09%
Vaccine cost/Total public operating expenditures	n.a.
Indicators related to staff	
Number of public veterinary paraprofessional NPS/Number of public veterinarians NPS	0.7
Number of public veterinarians NPS/Number of private veterinarians NPS	20.4
VLU/Number of public veterinarians NPS	7,567

3.6. Uganda

3.6.1. Country characteristics

Uganda is a landlocked country located in East Africa with a population of nearly 31 million and a land area of 241,040 km.² Uganda has international borders with five countries: Kenya to the east, Tanzania to the south, Rwanda to the southwest, the Democratic Republic of the Congo to the west and Sudan to the north. The country is also bordered to the south by a great portion of the Lake Victoria. More than two thirds of the country is a fertile plateau, lying between 1,000 to 2,500 metres above sea level.

According to the World Bank categorisation, Uganda is a low-income country, with a GNI per capita amounting to 920 international dollars in 2007. Almost 80% of the total Ugandan economically active population work in the agricultural sector, which accounts for 29% of the total Gross Domestic Product (GDP). In 2007, livestock population amounted to 8.8 million Veterinary Livestock Units (VLU).

Table 3.40: Country characteristics

Country characteristics	
General country data	
Land area[(a)]	241,040 km²
Total human population (2007) [(a)]	30.9 million
Agricultural population (2004) [(b)]	20.53 million
Economically active population in agriculture as share of total economically active population (2004) [(b)]	78%
Human development index value (2005) [(c)]	0.505
Gross Domestic Product, (billions of international dollars, 2007) [(a)]	32.77
GNI per capita, PPP (current international dollar, 2007) [(a)]	920
Agricultural GDP as share of total GDP (2007) [(a)]	29%
National budget expenditures (billions of international dollars, 2007) [(d)]	6.56
Livestock structure and type of production	
Livestock population (2007) [(e)]	Bovine: 7.18 million; Sheep: 1.70 million; Goats: 8.28 million; Pigs: 2.00 million; Poultry: 23.75 million; Rabbits: 0.10 million
Livestock population in VLU (2007) [(f)]	8.82 million
Livestock production system [(g)]	Livestock represents an integral part of agriculture in Uganda. More than 90% of the cattle herd and all of the small ruminants and non-ruminant stock is owned by mixed farming smallholders and pastoralists. 80% of the cattle herd is located in the southern and western parts of Uganda. In Uganda, extensive ruminant production accounts for 93% of the total livestock production while intensive production constitutes 7%.

	17% of the land area is defined by grassland-based systems and 62% is characterised by mixed farming systems.
Type of eco-system	
Description of eco-system [(h)]	More than two thirds of the country is a fertile plateau, lying between 1,000 to 2,500 metres above sea level. About 18% of Uganda is made up of water surface (Lake Victoria) and about 7% comprises highland situated at more than 1,500 m. Uganda is divided into 4 relief regions: above 2,000 meters (2%), between 1,500 and 2,000 meters (5%); between 900 and 1,500 meters (84%) and less than 900 meters (9%). Uganda has an equatorial climate, with temperatures varying according to the altitude, but remaining nevertheless within the range of 15°C to 30°C throughout the year. Precipitation varies across regions; the southern region has the highest annual precipitation level being in average around 1,500 mm, while the northeastern region has the driest climate with annual precipitation level around 750 mm.
Indicators for livestock production	
Livestock products as share of agricultural exports (2005, in value) [(i)]	In 2005, Uganda exported livestock products amounting to a total value of 1,262,000 USD, which corresponds to 0.3% of the total of agricultural exports for that year.
Net exports as a percentage of livestock production in quantity (2005; 2007) [(i)]	Uganda is a net exporter of negligible amounts of its livestock production (i.e. bovine, sheep and eggs).
Net imports as a percentage of domestic consumption of livestock products in quantity (2005; 2007) [(i)]	Uganda imports negligible amounts of its consumption of livestock products (i.e. pigs, poultry and milk).

Notes:

(a) World Development Indicators database, retrieved from web.worldbank.org and International Monetary Fund, World Economic Outlook Database, October 2008

(b) FAO Statistical Yearbook 2005-2006, retrieved from http://www.fao.org

(c) Based on figures from Human Development Report 2007/2008 (UNDP). Retrieved from http://hdr.undp.org/en/media/HDR_20072008_EN_Indicator_tables.pdf

(d) Calculations by Civic Consulting based on data from The World Factbook (2007), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/download/download-2007/index.html

(e) FAOSTAT Data, retrieved from http://faostat.fao.org

(f) Calculated on the basis of FAOSTAT livestock numbers and VLU coefficients from OIE Guidelines for writing of the OIE-PVS Evaluation report (2008), p.13 (slightly adapted to cover also buffaloes and rabbits).

(g) Livestock production percentages calculated on the basis of FAOSTAT livestock numbers and figures from FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org, and data on production system based on Thornton *et al.* (2002) pp. 17-21.

(h) Based on The World Factbook (2008), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/the-world-factbook, on the OIE-PVS Evaluation of Uganda (2007) p.11 and on figures from FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org, and on the OIE-PVS Evaluation of Uganda (2007) p.11-12.

(i) FAO Trade Data, retrieved from http://faostat.fao.org. Import and export data are from 2005, production data are from 2007, while consumption data are calculated on the basis of the above-mentioned data sets.

3.6.2. Animal health situation

In 2007, the total number of outbreaks reported to the OIE was 82, of which the most frequent were Rabies (46), Brucellosis B. Abortus (11), Lumpy Skin Disease (10), Brucellosis B. Melitensis (5) African Swine Fever (4), and FMD (2). The main disease prevention programmes undertaken in 2007 were a vaccination programme against FMD, and eradication programme against Tsetse and Trypanosomiasis and Rinderpest.

Table 3.41: Animal Health Situation

Animal Health Situation	
Animal disease outbreaks [(a)]	The total number of outbreaks reported to the OIE in 2007 was 82, of which the most frequent were: Rabies (46), Brucellosis B. Abortus (11), Lumpy Skin Disease (10), Brucellosis B. Melitensis (5), African Swine Fever (4) and, FMD (2).
Notifiable diseases [(b)]	A total of 7 officially notifiable diseases were present in the country and declared to the OIE in 2007: African Swine Fever, Brucellosis B. Abortus Brucellosis B. Melitensis, Contagious Bovine Pleuropneumonia, FMD, Lumpy Skin Disease, Rabies. In 2007 a preventive vaccination programme was implemented against FMD, and eradication programmes against Tsetse and Trypanosomiasis and Rinderpest.

Notes:
(a) OIE World Animal Health 2007.
(b) OIE WAHID, data from 2007 and Questionnaire Central Veterinary Authority Uganda 2008.

An overview of the animal health situation in the country is presented in Annex 5.

3.6.3. Main functional units of the NPS

In Uganda, the main functional units of the NPS are under the authority of the Directorate of Animal Resources of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). At central level, the main functional units of the NPS are the Department of Livestock Health and Entomology (DLHE), the Central Veterinary Laboratory, the Coordinating Office for the Control of Trypanosmosiasis in Uganda (COCTU) and the Uganda Wildlife Authority. At sub-national level, the main functional units include the District Veterinary Services (district departments of MAAIF).

The most frequent PVS level in the OIE PVS Evaluation of 2007 is 2. Detailed results of this Evaluation are presented on the following page.

Table 3.42: Main functional units of the National Prevention System

Main functional units of the National Prevention System for animal diseases and zoonoses	
Organisational structure of the National Prevention System	
Structure of the NPS	The Directorate of Animal Resources of Uganda is part of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). Relevant for the NPS is the Department of Livestock Health and Entomology (National Disease Control Division; Veterinary Inspectorate and Regulation Division; and Veterinary Entomology Division). At sub-national level, the main functional units include the District Veterinary Services of the Ministry (MAAIF).
Challenges for VS	Lack of animal movement control Lack of traceability system Lack of quarantine facility, and lack of culling facility The lack of equipment and means of transport and telecommunication Irregular supply of power poses a problem to storage of vaccines.
OIE PVS Evaluation of the Veterinary Services	
Most frequent PVS level	3
Veterinary personnel relevant for NPS	
A. Public veterinarians at central level NPS	23
B. Public veterinarians at sub-national level NPS	322
C. Total public veterinarians NPS (A+B)	345
D. Distribution of public veterinary personnel NPS (2007)	Veterinarians: 345 Graduate personnel (non veterinary): 77 Veterinary paraprofessionals/technicians: 214 Support personnel: 26
E. Private veterinarians conducting public service missions (in the framework of the NPS)	-
F. Total number of private veterinarians	129

3.6.4. Costs of the NPS

In Uganda, donor programmes represent almost a third of total operating expenditures for the NPS.

Table 3.43: Operating expenditures for 2007 in international dollars by main functional units

Main functional units	Operating expenditures	Comments
Central Level		
Central public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	12,933,105	
Border inspections and quarantine		
National veterinary laboratory/ies	n.a.	Central Veterinary Laboratory is integrated into the Department of Livestock Health and Entomology (DLHE) and partly financed from the department budget, partly from donor funds. No separate budget data are available.
Sub-national		
Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	3,955,021	
Municipal veterinary departments	0	
Sub-national veterinary laboratories	-	
Total public expenditures	16,888,126	
Donor programmes	6,481,169	
Grand total	23,369,295	

Detailed data concerning expenditures and on NPS staff positions are provided in the Tables on the following pages.

Table 3.44: Operating expenditures in international dollars (fiscal year 1st July 2006 to 30th June 2007)

	Central level					*Sub-national level*				
	Central veterinary service	**Central Veterinary Laboratory** [(a)]	**COCTU** [(b)]	**Uganda Wildlife Authority** [(c)]	**National Drug Authority**	**District Veterinary Services** [(d)]	**Munici-palities**	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (including donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	1,441,883	No separate budget data available	114,311	61,173	40,782	3,513,434	0	5,171,582	6,481,169	23,369,295
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	10,079,803	0	28,898	72,244	48,163	265,616	0	10,494,724		
Services *(e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	685,987	0	7,058	17,645	11,764	0	0	722,454		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)* [(e)]	44,831	0	8,703	10,510	7,007	16,514	0	87,565		
Compensation of livestock holders *(for animals culled for disease control purposes)*	0	0	0	0	0	0	0	0		
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)*	80,691	0	38,639	45,285	87,728	159,457	0	411,801		
Total operational expenditure	12,333,196	0	197,609	206,858	195,443	3,955,021	0	16,888,126		

Notes:

(a) CVL is integrated into the DLHE and partly financed from the DLHE budget, partly from donor funds.
(b) It is estimated that only 40% of total costs are considered as relating to animal health (60% human health).
(c) No budget directly available for Uganda Wildlife Authority. Expenditures are extrapolated on basis of staff numbers and budget data of other institutions at central level.
(d) No budget data directly available for all District Veterinary Services. Expenditures are extrapolated on basis of staff data and data collected for the districts of Mukuno, Igunga and Kampala.
(e) No budget data on consumption of fixed capital directly available. Consumption of fixed capital calculated on basis of inventory of equipments and buildings. The Central Veterinary Laboratory is assumed to be fully depreciated.

Table 3.45: Number of staff positions National Prevention System by category in 2007

	Central level					*Sub-national level*	*Total*
	Central veterinary service	**Central Veterinary Laboratory**	**COCTU**	**Uganda Wildlife Authority**	**National Drug Authority**	**District Veterinary Services**	
Veterinarians	18	CVL is integrated into the DLHE	0	3	2	322	***345***
Graduate personnel (non veterinary)	9		1		0	*67*	***77***
Veterinary paraprofessional / veterinary technicians	3		0		0	*211*	***214***
Support personnel (not included in total)	23		3		0		***26***
Total *(graduate and veterinary staff members)*	***30***	***0***	***1***	***3***	***2***	***600***	***636***

Table 3.46: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	1,065,321	1,699	n.a.	
Graduate personnel (non veterinary)	970,791	1,548	n.a.	
Veterinary paraprofessional / veterinary technicians	534,515	853	n.a.	
Support personnel	433,510	691	n.a.	

3.6.5. Analysis and discussion of findings

3.6.5.1. NPS expenditures in relation to national budget

In 2007, Uganda spent 1.92 international dollars per VLU for the total public operating expenditures of the NPS. The total public operating expenditures represent 0.05% of the GDP and 0.18% of the AGDP. The agricultural sector plays an important role in the Ugandan economy and contributes 29% to the GDP with the livestock sector contributing 17% to the AGDP.[95]

3.6.5.2. Budget allocation

Budget allocation to central and sub national level

77% of the total operating expenditures were reserved for institutions at central level. Those include the Central Veterinary Service (Department of Livestock Health and Etymology, DLHE) which received 73% of the total funds available and the remaining 3% divided between the Coordinating Office for the Control of Trypanosomiasis, the Uganda Wildlife Authority and the National Drug Authority. The high level of centralised spending in Uganda mainly reflects the significant under funding of the overall system.

Only 23% of the total operating expenditures were designated to the sub national level. All funds available to the sub national level were used by the District Veterinary Services.

Staff costs

With 31% a small percentage of the total public operating expenditures have been spent for staff costs.

Every public veterinarian NPS has to, on average care for 25,559 VLU. The ratio of public veterinary paraprofessionals NPS to public veterinarians NPS is 0.6. This results in 15,775 VLU per veterinary personnel NPS.

Material and supplies

62% of the public operating expenditures or, 1.19 international dollars per VLU, were used to finance materials and supplies like veterinary drugs, vaccines and other supplies such as stationary and fuel for vehicles. 54% of the total public operating expenditures were used to purchase vaccines.

Services

4% (0.08 international dollars/ VLU) of the total public operating expenditures were spent for services, which are for example fees for private veterinarians with public mission.

Consumption of fixed capital

Only the negligible amount of 0.01 international dollars per VLU of the total operating expenditures accounted for depreciation.

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[95] Mukiibi-Muka & Kirunda 2005.

Compensation of livestock holders

In 2007, the Ugandan government did not pay any compensation to livestock owners.

Other current expenditures

2% (0.05 international dollars/ VLU) of the total public expenditures were dedicated to other expenditures like travel expenditures and per diems.

3.6.5.3. Comparison with other countries

Uganda differs in many ways from the other countries in the sample. Regarding the budget Uganda spends with 54% the largest amount of its public operating expenditures on vaccines, which has an effect on the total expenditures for materials and supplies. Those as well are with 62% of the total operating budget higher than in any other country of the sample. However, it has to be noted that expenditures for vaccines were exceptionally high in 2007 due to vaccination programmes for FMD.

Uganda is a relatively small country and does have the second highest population density of 128 humans/km² after Vietnam. Compared to the other countries in the sample Uganda has the second highest livestock population density with 37 VLU/km.² The Ugandan NPS does not spend the smallest proportion of the public operating expenditures on staff costs, but VLUs per public veterinarian NPS is with 25,559 the largest after Morocco.

Table 3.47: Indicators related to NPS operating expenditures and staff

Indicators	
Indicators related to operating expenditures	
Total public operating expenditures/Veterinary Livestock Unit	1.92 intl. $
Total public operating expenditures including donor programmes/Veterinary Livestock Unit	2.65 intl. $
Total public operating expenditures /GDP	0.05%
Total public operating expenditures including donor programmes/GDP	0.07%
Total public operating expenditures /AGDP	0.18%
Total public operating expenditures including donor programmes/AGDP	0.25%
Donor programmes VS/Total public operating expenditures including donor programmes	28%
Staff costs/total public operating expenditures	31%
Non staff operating expenditures/total public operating expenditures	69%
Non-staff operating expenditures/veterinary personnel	20,961 intl. $
Non-staff operating expenditure/Veterinary Livestock Unit	1.33 intl. $
Total operating expenditures at central level as percentage of total	77%
Total public operating expenditures/National budget	0.26%
Total public operating expenditures including donor programmes/National budget	0.36%
Vaccine cost/Total public operating expenditures	54%
Indicators related to staff	
Number of public veterinary paraprofessional NPS/ Number of public veterinarians NPS	0.6
Number of public veterinarians NPS / Number of private veterinarians NPS	n.a.
VLU/Number of public veterinarians NPS	25,559

3.7. Vietnam

3.7.1. Country characteristics

Vietnam is a country located in Southeast Asia with a population of over 85 million and a land area of 329,310 km.² Vietnam has international borders to the southwest with Cambodia, to the northwest with Laos and to the north with China. The country has a coast on the South China Sea to the east. Of the country's land area, forest has the highest share with 28.6%, while agricultural land represents about 18.7%.

According to the World Bank categorisation, Vietnam is a low-income country, with a GNI per capita amounting to 2,550 international dollars in 2007. Approximately two thirds of the total Vietnamese economically active population work in the agricultural sector, which accounts for 20% of the total Gross Domestic Product (GDP). In 2007, livestock population amounted to 17.48 million Veterinary Livestock Units (VLU).

Table 3.48: Country characteristics

Country characteristics	
General country data	
Land area [(a)]	329,310 km²
Total human population (2007) [(a)]	85.1 million
Agricultural population (2004) [(b)]	54.2 million
Economically active population in agriculture as share of total economically active population (2004) [(b)]	66%
Human development index value (2005) [(c)]	0.733
Gross Domestic Product, (billions of international dollars, 2007) [(a)]	221.61
GNI per capita, PPP (current international dollar, 2007) [(a)]	2,550
Agricultural GDP as share of total GDP (2006) [(a)]	20%
National budget expenditures (billions of international dollars, 2007) [(d)]	62.16
Livestock structure and type of production	
Livestock population (2007) [(e)]	Bovine: 6.84 million; Goats and sheeps: 1.641 million; Pigs: 26.5 million; Poultry: 212.8 million; Horses: 0.087 million; Camels: 0.172 million; Buffaloes: 2.92 million
Livestock population in VLU (2007) [(f)]	17.48 million
Livestock production system [(g)]	In Vietnam ruminant production is based on small households and is classified into dairy cattle, buffaloes and small ruminants. There are few dairy cattle in large commercial units. About 94.5% belongs to farm households. Buffaloes meat production is mainly extensive, resting in the hands of smallholders. Most goats are privately-owned by smallholders. State farms just maintain some for research and breeding. In Vietnam, extensive ruminant production accounts for 58% of the total livestock production while intensive production constitutes 42%.

	1% of the land area is defined by grassland-based systems and 64% is characterised by mixed farming systems.
Type of eco-system	
Description of eco-system [h]	The country's relief consists mainly of mountains, small hills and lowlands. The southern region consists mostly of coastal lowlands, the central region of highlands, whereas the far northern and north-eastern regions of mountains. Of the country's land area, forest has the highest share with 28.6%, while agricultural land represents about 18.7%. Temperatures increase in latitude and vary across regions as a result of the great variety of ecosystems. Compared to the rain and summer seasons, winters are usually dry.
Indicators for livestock production	
Livestock products as share of agricultural exports (2005, in value) [i]	In 2005, Vietnam exported livestock products amounting to a total value of 28,531,000 USD, which corresponds to 1% of the total of agricultural exports for that year.
Net exports as a percentage of livestock production in quantity (2005; 2007) [i]	Vietnam is a net exporter of negligible amounts of its pig and egg production.
Net imports as a percentage of domestic consumption of livestock products in quantity (2005; 2007) [i]	Vietnam imports respectively 74.6%, 1.6% and 1.2% of its domestic consumption of milk, sheep and poultry, and a negligible amount of its domestic consumption of bovine.

Notes:

(a) World Development Indicators database, retrieved from web.worldbank.org and International Monetary Fund, World Economic Outlook Database, October 2008.
(b) FAO Statistical Yearbook 2005-2006, retrieved from http://www.fao.org
(c) Based on figures from Human Development Report 2007/2008 (UNDP). Retrieved from http://hdr.undp.org/en/media/HDR_20072008_EN_Indicator_tables.pdf
(d) Calculations by Civic Consulting based on data from The World Factbook (2007), Central Intelligence Agency, retrieved from https://www.cia.gov/library/publications/download/download-2007/index.html
(e) FAOSTAT Data, retrieved from http://faostat.fao.org
(f) Calculated on the basis of FAOSTAT livestock numbers and VLU coefficients from OIE Guidelines for writing of the OIE-PVS Evaluation report (2008), p.13 (slightly adapted to cover also buffaloes and rabbits).
(g) Livestock production percentages calculated on the basis of FAOSTAT livestock numbers, livestock production structure based on FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org,, and production systems data based on Thornton *et al.* (2002) pp. 17-21.
(h) Based on CIA The World Factbook (2008), retrieved from https://www.cia.gov/library/publications/the-world-factbook/ and on FAO Country Pasture Profiles (2006) retrieved from http://www.fao.org
(i) FAO Trade Data, retrieved from http://faostat.fao.org. Import and export data are from 2005, production data are from 2007, while consumption data are calculated on the basis of the above-mentioned data sets.

3.7.2. Animal health situation

In 2007, the total number of outbreaks reported to the OIE was 4,115, of which the most frequent were Haemorrhagic Septicaemia (1,754), Newcastle Disease (1,351), Classical Swine Fever (361), Leptospirosis (188) and FMD (150). The main disease prevention programmes undertaken in 2007 were targeted at FMD and HPAI.

Table 3.49: Animal Health Situation

Animal Health Situation	
Animal disease outbreaks [(a)]	The total number of outbreaks reported to the OIE in 2007 was 4,115, of which the most frequent were: Haemorrhagic Septicaemia (1,754), Newcastle Disease (1,351), Classical Swine Fever (361), Leptospirosis (188), and FMD (150).
Notifiable diseases and diseases for which measures were taken [(b)]	A total of 9 officially notifiable diseases were present in the country and declared to the OIE in 2007.

Notes:
(a) OIE World Animal Health 2007.
(b) OIE WAHID, data from 2007.

An overview of the animal health situation in the country is presented in Annex 5.

3.7.3. Main functional units of the NPS

In Vietnam, the main functional units of the NPS are under the authority of the Department of Animal Health (DAH) of the Ministry for Agriculture and Rural Development (MARD). At central level, the main functional unit of the NPS is the Department of Animal Health (DAH), the National Centre (laboratory) for Veterinary Diagnostics, two National Centres (laboratories) for Hygiene and Inspections, and four Veterinary Inspection Posts. At sub-national level, the main functional units include: 7 Regional Animal Health Laboratories (RAHL) under the authority of the DAH, 64 Provincial Veterinary Departments, 550 District Veterinary Stations (DVS) and Communal Veterinary Teams. The most frequent PVS level in the OIE PVS Evaluation of 2007 is 3. Detailed results of this Evaluation are presented on the following page.

Table 3.50: Main functional units of the National Prevention System

Main functional units of the National Prevention System for animal diseases and zoonoses	
Organisational structure of the National Prevention System	
Structure of the NPS	The Vietnamese VS belong to the Ministry of Agriculture and Rural Development and are under the technical direction of Department of Animal Health (DAH) at the central level. The structure is as follows: o 7 Regional Animal Health Centres (RAHC); National Centre for Veterinary Diagnostics (laboratory), 2 National Centres for Hygiene and Inspections (laboratories), and 4 Border Quarantine Centres (inspection). These institutions are under the authority of the directions of DAH; o 64 Provincial Veterinary Departments; o 550 District Veterinary Stations (DVS); o Communal Veterinary Teams
Challenges for VS	Lack of diagnosis facilities at sub-national level Limited means of communication in DVSs Lack of equipment, lack of means of transportation at sub-national level Inadequate infrastructure at slaughterhouses for waste disposal Lack of animal identification and registration system Problem of illegal trade in live animals
OIE PVS Evaluation of the Veterinary Services	
Most frequent PVS level [(a)]	2
Veterinary personnel relevant for NPS	
A. Public veterinarians central level NPS	117
B. Public veterinarians sub-national level	4050
C. Total public veterinarians NPS (A+B)	4272
D. Distribution of public veterinary personnel NPS (2007)	Veterinarians: 4272 Graduate personnel (non veterinary): 73 Veterinary paraprofessionals/technicians: 11646 (estimate based on extrapolation results) Support personnel: 116
E. Private veterinarians conducting public service missions (NPS)	No data
F. Total number of private veterinarians	No data

Note: (a) PVS levels of advancement in the PVS Evaluation Vietnam (from level 0 to 4) were adjusted to the scale used in the other evaluations (from level 1 to 5).

3.7.4. Costs of the NPS

In Vietnam, almost 70% of total expenditures (including donor programmes) for the NPS are disbursed at sub-national level. Donor programmes represent 7% of total operating expenditures. Expenditures related to the functioning of laboratories (at central and sub-national levels) constitute 4% of total operating expenditures.

Table 3.51: Operating expenditures for 2007 in international dollars by main functional units

Main functional units	Operating expenditures	Comments
Central Level		
Central public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	16,063,579	
Border inspections and quarantine	562,353	Part of the Border Inspection Posts are under the authority of the provincial administration.
National veterinary laboratory/ies	1,256,035	
Sub-national		
Sub-national units of public Veterinary Authority (including veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)	47,495,699	
Municipal veterinary departments		
Sub-national veterinary laboratories	1,978,107	
Total public expenditures	67,355,773	
Donor programmes	5,263,218	
Grand total	72,618,991	

Detailed data concerning expenditures and on NPS staff positions are provided in the Tables on the following pages.

Table 3.52: Operating expenditures for 2007 in international dollars

<table>
<tr><th rowspan="2"></th><th colspan="4">Central level</th><th colspan="4">Sub-national level</th><th colspan="3"></th></tr>
<tr><th>Department of Animal Health</th><th>National Centre (lab.) for Vet. Diagnostics</th><th>National centres (lab.) for hygiene and inspections</th><th>Veterinary Inspection Posts</th><th>Provincial Veterinary Departments (b)</th><th>District Veterinary Stations (DVS) (b)</th><th>Communal Veterinary Teams (b)</th><th>Regional Animal Health Lab.</th><th>Total public expenditures VS</th><th>Donor programmes</th><th>Total public expenditures VS (incl. donor progr.)</th></tr>
<tr><td>Staff costs (including wages, social contributions and non-wage income, i.e. in-kind payments)</td><td>209,019</td><td>98,385</td><td>99,053</td><td>167,911</td><td colspan="3">28,514,080</td><td>573,655</td><td>29,662,103</td><td rowspan="7">5,263,218</td><td rowspan="7">72,618,991</td></tr>
<tr><td>Material supplies (e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)</td><td>15,335,317</td><td>308,094</td><td>245,230</td><td>298,018</td><td colspan="3">6,818,366</td><td>1,115,522</td><td>24,120,547</td></tr>
<tr><td>Services (e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)</td><td>183,954</td><td>0</td><td>0</td><td>0</td><td colspan="3">2,127,966</td><td>0</td><td>2,311,920</td></tr>
<tr><td>Consumption of fixed capital (c) (reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)</td><td>308,932</td><td>229,375</td><td>257,030</td><td>85,217</td><td colspan="3">8,073,387</td><td>229,375</td><td>9,183,316</td></tr>
<tr><td>Compensation of livestock holders (for animals culled for disease control purposes)</td><td>0</td><td>0</td><td>0</td><td>0</td><td colspan="3">0</td><td>0</td><td>0</td></tr>
<tr><td>Other current expenditures (e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)</td><td>26,357</td><td>4,787</td><td>14,082</td><td>11,207</td><td colspan="3">1,961,901</td><td>59,554</td><td>2,077,888</td></tr>
<tr><td>Total operational expenditure</td><td>16,063,579</td><td>640,641</td><td>615,394</td><td>562,353</td><td colspan="3">47,495,699</td><td>1,978,107</td><td>67,355,773</td></tr>
</table>

Notes:

(a) No budget data directly available for all sub national institutions, except for Regional Animal Health Laboratories. Expenditures are extrapolated on basis of staff data and data collected for the provinces of Hanoi and Hanam.

(b) No budget data on consumption of fixed capital directly available for the Department of Animal Health, Ministry of Agriculture and Rural Development. Consumption of fixed capital is calculated on basis of inventory of equipments and buildings and estimates of useful lives and replacement costs.

Table 3.53: Number of staff positions National Prevention System by category in 2007

	Central level				*Sub-national level*				*Total*
	Department of Animal Health	**National Centre (lab.) for Vet. Diagnostics**	**National centres (lab.) for hygiene and inspections**	**Veterinary Inspection Posts**	**Provincial Veterinary Departments**	**District Veterinary Stations (DVS)**	**Communal Veterinary Teams**	**Regional Animal Health Lab.**	
Veterinarians	43	21	18	35	4050			105	***4272***
Graduate personnel (non veterinary)	6	1	7	2	48			9	***73***
Veterinary paraprofessional / veterinary technicians	2	1	0	8	11622			13	***11646***
Support personnel (not included in total)	6	1	2	2	87			18	***116***
Total *(graduate and vet. staff members)*	***51***	***23***	***25***	***45***	***15720***			***127***	***15991***

Table 3.54: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in int. Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in int. Dollars)**
Veterinarians	1,504,667	291[96]	1,700,000	329
Graduate personnel (non vet.)	1,550,000	300	1,700,000	329
Vet. paraprofessional / vet. technicians	1,250,000	242	2,430,000	471
Support personnel	1,433,333	278	2,176,000	422

[96] The level of salaries of NPS personnel in Vietnam may depend more on seniority that on level of education. This explains why average compensation of veterinarians is lower than average compensation of graduate personnel at central level.

3.7.5. Analysis and discussion of findings

3.7.5.1. NPS expenditures in relation to national budget

In 2007 the total operating expenditures for the NPS in Vietnam amounted to 3.85 international dollars per VLU. The total operating expenditures represented 0.03% of the GDP and 0.16% of the AGDP. Measured as a proportion of the total national budget the total operating expenditures added up to 0.12%. Donor programmes amounted to 7% of the total public operating expenditures. The livestock sector accounted for 16.5% of the AGDP.[97]

3.7.5.2. Budget allocation

Budget allocation to central and sub national level

27% (1.02 international dollars per VLU) of the total operating expenditures are destined for the central level. Of these funds 24% were accounted for by the Department of Animal Health (DAH) and the Ministry of Agriculture and Rural Development (MARD) with the rest divided between the National Centre for Veterinary Diagnostics, the National Centres for Hygiene and Inspections and the Veterinary Inspection Posts.

The sub national level received 73% of the available funds (excluding donor programmes). On sub national level it is not possible to distinguish the expenditures of the Provincial Veterinary Departments, the District Veterinary Stations and the Communal Veterinary Teams. These sub-national Veterinary Services received 71% of the total public operating expenditures.

Staff costs

44% of the total public operating expenditures are dedicated to the staff costs. On average a public veterinarian NPS had to care for 4,092 VLUs. With 2.7 times as many veterinary paraprofessionals than public veterinarians in the country every public veterinary personnel NPS was on average responsible for 1,098 VLUs.

Staff expenditures were mainly accounted for at sub national level with the sub national Veterinary Services accounting for 96% and the Regional Animal Health Centres for 2% of the total expenses for staff costs. The remaining 2% were accounted for by the DAH and the Veterinary Inspection Posts.

Material and supplies

36% (1.38 international dollars per VLU) of the total public operating expenditures were dedicated to material supplies (e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles). Two thirds of the expenditures for materials and supplies were accounted for at central level with the largest share used by the DAH. Of the total operating expenditures 22% were used for the purchase of vaccines.

Services

Services (e.g. fees for accredited veterinarians with public mission, communications, etc.) contribute 0.13 international dollars per VLU or 3% to the total public operating expenditures

[97] RUDEC 2008. Pig sector and demand for safe food products in northern part of Vietnam.

for the NPS. Of those 0.13 international dollars per VLU 92% were accounted for by the sub national Veterinary Services and 8% at central level by the DAH.

Consumption of fixed capital

Depreciation accounted for 14% (0.53 international dollars per VLU) of the total public operating expenditures. Nearly all of those funds (90%) where accounted for at sub national level. The 10% at central level were divided between the DAH (3%), the National Centres for Hygiene and Inspections (3%), the National Centre for Veterinary Diagnostics (2%) and the Veterinary Inspection Posts.

Compensation of livestock holders

The Veterinary Services of Vietnam do not compensate for culling animal due to a disease outbreak and no expenditures for compensation were therefore registered in 2007. However, there is a general National Prevention/Emergency Fund under the Ministry of Finance to control and prevent risks such as natural damage, epidemic livestock disease and human disease outbreaks. Due to the emergency nature of spending from this fund, related expenditures under the responsibility of the Ministry of Finance have not been considered for the assessment of NPS expenditure.

Other current expenditures

Other current expenditures are for example travel expenditures, per diems, interest, subsidies, maintenance etc. and amounted to 0.1% of the total public operating expenditures.

3.7.5.3. Comparison with other countries

Vietnam is the country with the highest human and livestock population density in the sample. As well as the NPS of Morocco, the Vietnamese NPS relies heavily on public veterinarians. With a ratio of 2.73 between veterinary paraprofessionals and veterinarians Vietnam has the highest ratio of all countries of the sample (slightly more than Morocco) and public veterinary personnel has to care for the least number of VLUs (1,098) of all countries included in the sample.

Table 3.55: Indicators related to NPS operating expenditures and staff

Indicators	
Indicators related to operating expenditures	
Total public operating expenditures/Veterinary Livestock Unit	3.85 intl. $
Total public operating expenditures including donor programmes/Veterinary Livestock Unit	4.15 intl. $
Total public operating expenditures/GDP	0.03%
Total public operating expenditures including donor programmes/GDP	0.03%
Total public operating expenditures/AGDP	0.15%
Total public operating expenditures including donor programmes/AGDP	0.16%
Donor programmes VS/Total public operating expenditures including donor programmes	7%
Staff costs/Total public operating expenditures	44%
Non staff operating expenditures/Total public operating expenditures	53%
Non-staff operating expenditures/Veterinary personnel	2,241 intl. $
Non-staff operating expenditure/Veterinary Livestock Unit	2.04 intl. $
Total operating expenditures at central level as percentage of total	27%
Total public operating expenditures/National budget	0.11%
Total public operating expenditures including donor programmes/National budget	0.12%
Vaccine cost/Total public operating expenditures	22%
Indicators related to staff	
Number of public veterinary paraprofessional NPS/Number of public veterinarians NPS	2.7
Number of public veterinarians NPS/Number of private veterinarians NPS	-
VLU/Number of public veterinarians NPS	4,092

4. Synthesis of country case studies

In the framework of this study, the costs of the National Prevention Systems for Animal Diseases and Zoonoses were assessed in a total of nine countries. For seven of these countries (Costa Rica, Kyrgyzstan, Mongolia, Morocco, Turkey, Uganda, and Vietnam) a complete and final data set was obtained, allowing for a comprehensive analysis of NPS costs. In addition, partly incomplete data sets were supplied by two countries (Romania and Uruguay). The following analysis mainly focuses on the seven countries for which a full data set is available.

The detailed results per country are presented in the previous sections of the report. This section provides a synthesis of the case study results. It is structured as follows:

- Overview of the case study results and key data of case study countries (section 4.1);
- Review of possible reasons for differences between the case study countries in the total costs of the National Prevention System (section 4.2);
- Analysis of specific expenditures related to the NPS in the case study countries (section 4.3).

Please note that in the following sections the terms "NPS expenditure" and "NPS costs" are used synonymously and refer to the <u>total domestic public operating expenditure related to the National Prevention System</u> as defined in section 2.3.3 (above).

4.1. Overview of case study results

Estimates of the total public expenditures on the National Prevention System for the seven case study countries for which a full data set is available are listed in Table 4.1 on the next page together with other key data.

In the first row of Table 4.1, the total NPS expenditure is presented. Substantial differences exist between the case study countries concerning the NPS expenditure. The arithmetic mean, or average, expenditure on the National Prevention System, for the seven countries is 48.6 million international dollars. These figures are quoted net of donor support programmes, so they reflect only domestic spending on animal disease prevention.

In the second row of the Table additional expenditure derived from foreign assistance programmes is included in the total NPS expenditure for each country. The only change in the ordering of the countries, in terms of total NPS expenditure is that the value for Uganda is raised above that for Mongolia. The following analyses of NPS expenditures in the case study countries are based on the total domestic expenditure excluding foreign assistance. There are several reasons for this: Firstly, it is often difficult to assign donor programmes to different functional units within the national total, as is possible with the domestic expenditures;[98] secondly, the size of donor programmes may vary significantly between years, which could distort the picture; and thirdly, donor programmes are sometimes difficult to compare with government expenditure programmes, both in scope and allocation of resources.[99]

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98 While the Paris Declaration on Aid Effectiveness in 2005 reaffirmed the commitment of donors to increase alignment of aid with partner countries' priorities, systems and procedures, and to use country systems and procedures to the maximum extent possible, the research conducted in case study countries indicated that for the period under investigation it was not always possible to relate donor funding to NPS activities of main functional units.

99 For example, it is often difficult from the data obtained to differentiate the amount of a donor programme used for activities that would be considered an operating expenditure (e.g. training), and the amount spent on capital

Table 4.1: NPS expenditures and key data of case study countries for which complete data set was available (2007)

	Costa Rica	Kyrgyz-stan	Mongolia	Morocco	Turkey	Uganda	Vietnam	*Average*
OIE-Region	*The Americas*	*Europe & Central Asia*	*Asia*	*Africa*	*Europe & Middle East*	*Africa*	*Asia*	
NPS costs (000) intl. $	11,172	10,043	21,086	46,811	166,962	16,888[(a)]	67,356	*48,617*
NPS costs with donor programmes (000) intl. $	11,584	11,517	21,702	48,698	180,080	23,369[(a)]	72,619	*52,796*
Land area (000) km^2	51	200	1,567	447	784	241	329	*517*
Population (000)	4,398	5,258	2,604	30,852	73,888	30,930	85,140	*33,300*
GDP (PPP) million intl. $	46,021	10,508	8,426	126,943	885,905	32,767	221,614	*190,312*
Veterinary Livestock Units (000)	1,365	1,766	6,381	6,455	17,765	8,818	17,483	*8,576*
Number of public sector veterinarians NPS	117	1,096	450	240	2,910	345	4,272	*1,347*
VLU / Number of public veterinarians NPS	11,648	1,612	14,179	26,894	7,567	25,559	4,092	*13,079*

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Notes: (a) Fiscal year 1.7.2006 to 30.6.2007.
Median values are underlined (see the glossary on page 9 for a definition of *median*).

The following rows of the Table present key data of the case study countries concerning land area, population, economy, and staffing of the Veterinary Services. Main features include:

- There are huge differences in land area between Costa Rica (the smallest country in the sample with 51,100 km^2) and Mongolia (the largest country in the sample with 1,566,500 km^2);
- The variation in human population and population density is large. Mongolia has a population of only 2.6 million and a density of only 1.7 inhabitants per km^2, while Vietnam has a population of 85.1 million and a density of 259 inhabitants per km^2;

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expenditures. Also, in recent years donors have financed programmes related to Avian Influenza that target both human and animal health and are sometimes difficult to allocate to the different budget components.

- The total livestock population, measured in Veterinary Livestock Units (VLUs), also varies significantly between case study countries, from Costa Rica with a livestock population of 1.4 million VLU, to Turkey with 17.8 million VLU;
- Gross domestic product (GDP) is a general measure of the level of economic activity. Case study countries differ in GDP even more than concerning other parameters, with the sample including countries such as Mongolia with a GDP of 8.4 billion international dollars, and Turkey with a GDP that is more than 100 times larger (885 billion international dollars).

These data clearly underline the diversity of the sample, in line with the requirement of the Terms of Reference of this study to cover different regions, economies, animal health systems and eco-systems. Less obvious are patterns in the data presented that could provide some insight concerning the relationship of different factors influencing the total cost of the National Prevention System. Is it land area or livestock population, or rather the level of economic development that makes a difference and determines what a country invests in the prevention of animal diseases and zoonoses in a systemic perspective?

The following section reviews and illustrates possible reasons for differences between the case study countries in National Prevention System expenditures. This analysis is based on a theoretical review of the factors that are likely to influence the level of a country's NPS costs. Despite the limitations of small sample size, data from the case study countries were used in simple correlation between pairs of variables to test for strength of linear association. In cases where a reasonably strong association was observed, a regression line was fitted, and is presented below.[100]

4.2. Analysis of factors that influence total NPS costs in case study countries

4.2.1. Land area, population and livestock

The first and most obvious difference between countries is that of size or scale. Although a critical minimum volume of human and physical resources may be needed, in any country, to provide a National Prevention System that complies with OIE International Standards on Quality of Veterinary Services (VS), total needs must vary with the *land area* of the country, the *human population* and the size of its *livestock sector*.

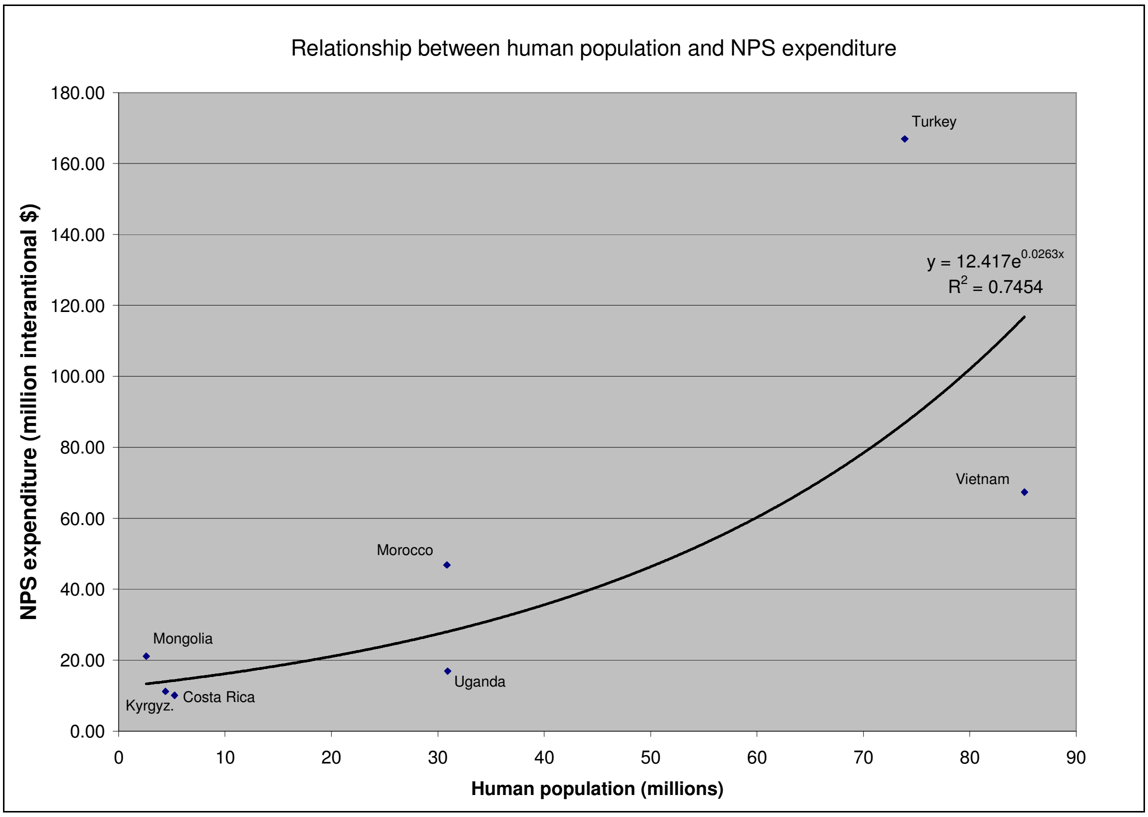
4.2.1.1. Land area and human population

Table 4.1 above illustrates the huge differences in land area between the case study countries. However, comparisons between countries suggest that there is no obvious association between land areas and total NPS costs. Mongolia, the largest country, with an area of over 1.5 million square kilometres, has a moderate level of NPS expenditure. Turkey, Vietnam and Morocco, with much smaller land areas have considerably higher total NPS expenditures. Land areas alone are unsatisfactory measures of size, because of variation in densities of human and livestock populations and general economic activity.

[100] As a result of the small number of case study countries, relationships that appear to be quite strong in explaining a high percentage of the variation in the dependent variable, can still have considerable sampling errors (see discussion of study limitations in section 6.2.3.1. below). The study team has therefore applied all possible caution in interpreting the results, and has only presented those findings that appear to be supported not only by the statistical analysis, but also by a thorough qualitative analysis of facts.

This absence of an association between land area and NPS expenditure may in part be due to differences in population density which is extremely low in Mongolia, compared with the other six countries, particularly Vietnam where population density is very high. However, the relationship between NPS expenditure and human population is still fairly weak and apparently non-linear (see scatter-graph below).

Figure 4.1: Relationship between NPS expenditure and human population



Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

The trend line shows an exponential increase in NPS costs with increase in human population. It appears to show increasing NPS costs with increases in population. However, there is clearly a wide scatter of points around this best-fit line. Hence, no consistent association could be found between size, measured by land area or human population, and the total NPS expenditure. Nonetheless particular features, such as the vast sparsely populated area of Mongolia or the dense human population of Vietnam, may help to explain characteristics, such as the degree of centralisation of NPS services.

4.2.1.2. Size of livestock sector

A Veterinary Livestock Unit (VLU) is an equivalence unit for the estimate of annual veterinary cost and care. For example, according to the definition one bovine requires the same annual veterinary cost and care as ten sheep or a hundred chickens.[101] The total livestock population, measured in Veterinary Livestock Units is therefore, by definition, the most appropriate measure of the scale of veterinary service requirements.[102] This is born out by the fact that Costa Rica and Kyrgyzstan have similar low livestock populations and report the lowest levels of NPS costs, while Turkey, followed by Vietnam, has the highest livestock population and the highest level of NPS costs. Even this measure is imperfect, since it lacks distinctions between different types of livestock production systems. In poultry production, for instance, there are major differences in the health risks and veterinary needs of birds in backyard production systems from those in commercial and industrial systems. However, the task of re-defining the VLU conversion factors to allow for differences in production systems, and allocating animal and bird numbers to each type of system is beyond the scope of this study. Despite these obvious limitations, the operational costs of the National Prevention System, when expressed on a per VLU basis, give a meaningful comparative measure of the level of service provision in relation to the quantitative requirements. Hence, for the analysis of operational costs of NPS inputs, they are all expressed on a per VLU basis, using the currently accepted conversion factors. Although use of this ratio allows adjustment for the direct effect of scale on the total level of veterinary requirements, much variation remains in the average NPS cost per VLU, which is presented in the following Table.

Table 4.2: NPS expenditure expressed on a per VLU basis (2007)

	Costa Rica	**Kyrgyz-stan**	**Mongolia**	**Morocco**	**Turkey**	**Uganda**	**Vietnam**	***Average***
NPS costs (000) intl. $	11,172	10,043	<u>21,086</u>	46,811	166,962	16,888[(a)]	67,356	*48,617*
Veterinary Livestock Units (000)	1,365	1,766	6,381	<u>6,455</u>	17,765	8,818	17,483	*8,576*
NPS costs per VLU in intl. $	8.18	<u>5.69</u>	3.30	7.25	9.40	1.92	3.85	*5.66*

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

Notes: Median values are underlined. NPS costs exclude donor programmes.

There is no clear evidence from the case study results, to indicate increasing returns or decreasing returns to scale. Turkey, with the largest VLU population, and Cost Rica, with the smallest VLU population, have similar high levels of NPS expenditure per VLU of 9.40 international dollars and 8.18 international dollars respectively. In contrast Uganda, with an intermediate VLU population spends only 1.92 international dollars on NPS provision per VLU.[103]

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[101] The coefficients applied to calculate livestock populations in Veterinary Livestock Units are as follows: bovine (1), sheep (0.1), goats (0.1), pigs (0.2), poultry (0.01), horses (0.5), camels (0.5), rabbits (0.01), buffaloes (1). See OIE 2008a, p. 13 (slightly adapted to cover also buffaloes and rabbits).

[102] See section 5.1.1.2 for a detailed discussion of the concept of VLU, limitations of this measure and on possible ways of improvements.

[103] These figures are higher than the results obtained in the PACE study (see section 2.4.1). The scopes of the two studies are however very different; and results are therefore not directly comparable. The PACE study examines

This leads to the following conclusion:

1. ***Substantial differences in the expenditure for the National Prevention System for Animal Diseases and Zoonoses exist between case study countries.*** For Turkey, expenditures are with 167 million international dollars roughly 17 times greater than for Kyrgyzstan with 10 million international dollars. Variations in expenditures between case study countries are clearly associated with differences in livestock population. Operational costs of the National Prevention System, when expressed on a per Veterinary Livestock Units (VLU) basis, therefore give a meaningful comparative measure of the level of service provision in relation to the quantitative requirements.

4.2.2. Economic development

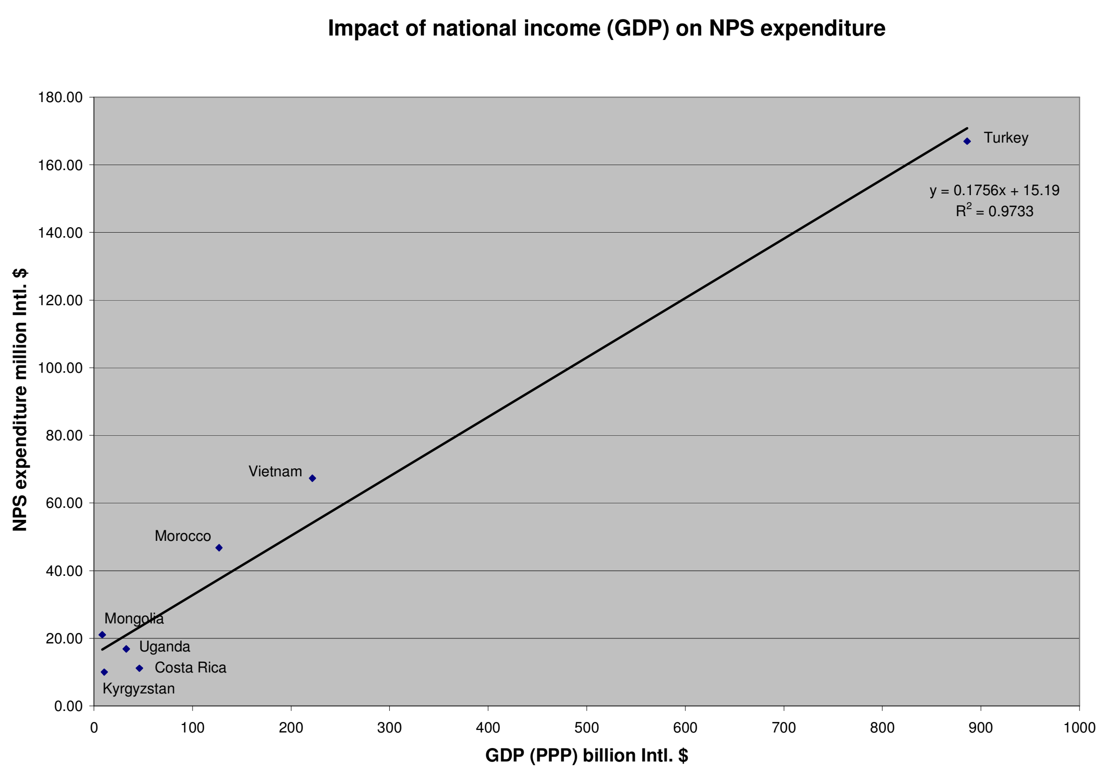
4.2.2.1. National Income

Gross Domestic Product (GDP) is a general measure of the level of economic activity. From the case study data given in Table 4.1 (above) and plotted in the Figure below, there appears to be a close association between this measure of size and the total NPS costs. The straight-line relationship with GDP gives a good fit and explains 97 percent of the variation in NPS expenditures.[104]

the costs of the Epidemiological Surveillance System (ESS), which is defined as a set of individuals and institutions, structured and organised in such way as to carry out surveillance of one or more diseases in a given territory (PACE 2005). The costs of an ESS, as defined in the PACE study, does not include, for example, the compensation of livestock holders and the costs of vaccines. The scope of an ESS is therefore more limited than the boundary of the NPS defined in the present study.

[104] The percentage of variation explained by the linear regression (or trend line) in Figure 4.2 is expressed in the coefficient of determination R^2 (which has in this Figure the value 0.9733). In regression, R^2 is a statistical measure of how well the regression line approximates the real data points. R^2 is often interpreted as the proportion of response variation "explained" by the linear regression model. Thus, R^2=1 indicates that the fitted model explains all variability in y, while R^2=0 indicates no 'linear' relationship between the variables. A value such as R^2=0.75 can be interpreted to mean that approximately seventy five percent of the variation in the response variable can be explained by the explanatory variable. The remaining twenty five percent can be explained by unknown, lurking variables or inherent variability. It is important to note that "correlation does not imply causation." While correlations may provide clues regarding causal relationships among variables, a high correlation between two variables does not represent adequate evidence that changing one variable has resulted, or may result, from changes of other variables.

Figure 4.2: Relationship between NPS expenditure and Gross Domestic Product



Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

The equation of the trend line or, in other words, the linear regression model provided in the Figure 4.2 above implies that a difference in GDP, between countries, of one billion international dollars would be reflected in a difference, in NPS expenditure, of 176 thousand international dollars. This relationship may be of use in predicting NPS expenditures for other countries. However, it seems to imply that NPS expenditure is mainly dependent on the country's ability to pay, rather than on veterinary requirements.

This leads to the following conclusion:

2. ***In the case study countries, there is a close relationship between Gross Domestic Product (GDP) and the total expenditures for the National Prevention System.*** Differences in GDP explain to a large degree the variation in NPS expenditures. This seems to imply that NPS expenditure is mainly dependent on the country's ability to pay, rather than on the veterinary requirements.

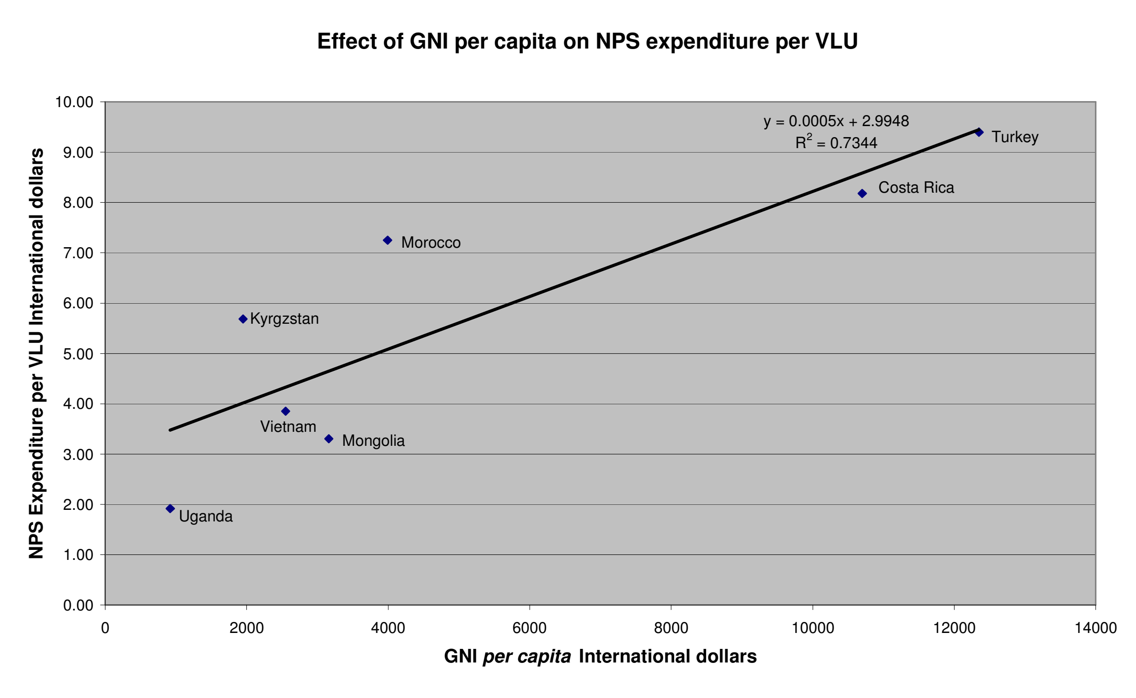
4.2.2.2. Per capita income

Given the strong relationship, already established, between Gross Domestic Product and the national total NPS operating expenditure, it is likely that this NPS expenditure, when related to requirements in VLUs, will be influenced by the average level of *per capita* income. Per capita income (expressed as Gross National Income or GNI per capita of population), is a commonly used criteria to categorize countries according to the level of economic development. Of the case study countries, Uganda, Kyrgyzstan and Vietnam are categorized as 'low-income countries',[105] Mongolia and Morocco are 'lower-middle income' countries,[106] and Costa Rica and Turkey are 'upper-middle income' countries.[107]

When the countries are ranked in order of increasing GNI *per capita*, the ordering of NPS expenditures per VLU broadly corresponds. Hence the differences in NPS costs between countries are, at least partly, explained by differences in *per capita* incomes. While the overall average NPS cost per VLU for the seven countries amounts to 5.66 international dollars, the average for the three low-income countries, Uganda, Kyrgyzstan and Vietnam, is only 3.82 international dollars. The average for the two lower-middle-income countries, Mongolia and Morocco, is 5.28 international dollars, while that for the upper-middle-income countries, Costa Rica and Turkey, is 8.79 international dollars.

The results of the case studies are plotted in the next Figure.

Figure 4.3: Relationship between NPS expenditure and *per capita* income



Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

The trend line provided in this graph does not provide as good a fit to the data as that in previous Figure 4.2, yet the differences between the low and lower-middle-income countries

[105] Average GNI *per capita* in 2007 of 935 US$ or less. Classification, based on upper and lower limits in US$, are provided by the World Bank 2009. Available at: http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html.

[106] Average GNI *per capita* in 2007 of between 936 US$ and 3,705 US$.

[107] Average GNI *per capita* in 2007 of between 3,706 US$ to 11,456 US$. Please note that purchasing power parity international dollar values (which are used in this study) are generally higher than the US$ values.

and the upper-middle-income countries together with the upward slope of the trend line, do support the hypothesised effect of *per capita* income on NPS expenditure per VLU.

From this relationship, and the different average levels of NPS expenditure per VLU for categories of low income, lower-middle income and upper middle-income countries, the results for individual countries may be analysed. Costa Rica has a comparatively high level of NPS expenditure per VLU, associated with a comparatively high level of *per capita* income, as expected. However, in comparison with Turkey, the other upper-middle-income country, the NPS expenditure is relatively low. Turkey has the highest level of NPS expenditure per VLU associated with the highest *per capita* income, of all seven countries for which a full data set was available.

In Mongolia, NPS expenditure per VLU is quite low, while the GNI per capita puts it in the lower-middle income class. Morocco, the other lower-middle-income country, has a higher than expected NPS expenditure per VLU.

For Kyrgyzstan, the level of NPS expenditure per VLU is about average for the seven countries, but this is despite a low level of *per capita* income. In comparison with other low-income countries, the NPS expenditure per VLU is therefore rather high. Vietnam has an NPS expenditure per VLU and a GNI *per capita* that are both below average for the seven countries. Uganda has the lowest levels of both NPS expenditure per VLU and *per capita* income.

There are several reasons why lower NPS standards and expenditures are achieved in low income developing countries, than in higher income countries. First, government revenues raised through general taxation, and private funds, have a comparatively high opportunity cost, meaning a high value of alternatives foregone, in developing countries. These countries are characterised by under-investment in many other public goods, such as transportation and communications infrastructure, schools and hospitals, as well as the protection of animal health. Many of these other investments have high social rates of return.

Furthermore, livestock productivity, measured by kilogramme of meat, milk or eggs produced per head annually, in developing countries is generally lower than that achieved in the high-income countries.[108] This means that the benefits derived from an extra dollar of spending on animal health improvement is likely to earn a smaller return in a developing country than it would in a high-income country. The optimal level of spending on animal health and National Prevention Systems is therefore likely to be lower in low income developing countries, than in higher income countries.

This leads to the following conclusion:

3. ***Differences in NPS expenditures between countries on a per VLU basis are, at least partly, explained by differences in per capita incomes.*** While the overall average NPS cost per Veterinary Livestock Unit for the seven countries amounts to 5.66 international dollars, the average for the three low-income countries, Uganda, Kyrgyzstan and Vietnam, is only 3.82 international dollars. The average for the two lower-middle-income countries, Mongolia and Morocco, is 5.28 international dollars, while that for the upper-middle-income countries, Costa Rica and Turkey, is 8.79 international dollars.

[108] Upton & Otte 2004.

4.2.3. Trade

Global trade in livestock products has grown rapidly over the last quarter of a century, bringing with it increased risks of the spread of transboundary disease. For importing countries, border protection is an essential element, and a key hazard point, of the NPS, aimed at preventing entry of infectious disease.[109] Appropriate checks and controls are imposed either at the border or by monitoring production processes in the country of origin. High-income countries, such as those of the European Union, North America and Japan, may impose tighter, more rigorous rules than those currently in operation in developing countries. Hence, the high-income country rules might serve as non-tariff barriers to exports from developing countries.

The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) of the World Trade Organization (WTO) provides for adjudication of disease related inter-country trade disputes, in particular to ensure that they are not used as disguised measures to protect developed, high-income country producers from competing imports. OIE International Standards are recognised by the World Trade Organization as reference international sanitary rules.

In recent decades most developing countries have become net importers of crop and livestock products. This means that the gross value of imports exceeds that of exports. Quantities involved generally represent a small proportion of total national production or consumption. However, some middle-income countries in Latin America (such as Brazil and Uruguay), Southern Africa and East Asia are dependent on exporting a large proportion of their total production of one or more livestock products. These countries have a strong incentive to comply with the OIE International Standards, so that their livestock products may be accepted for import to the high-income countries of the European Union, North America and Japan.

Imports of livestock products have grown, along with their consumption, most rapidly in the developing countries, in what has become known as the 'Livestock Revolution'.[110] Dairy products are by far the most important type of livestock product, imported into developing countries, but between 1990 and 2000 imports grew by only 2.4 percent annually while those of meat grew by 10 percent. Within this total of all meats, imports of poultry meat increased by nearly 16 percent annually or by four and a half times over the 10 years. Imports of pig meat tripled over the same period. However, over the same period lower-middle-income countries such as China and Thailand have been major exporters of poultry meat while in recent years Brazil has become the largest exporter of poultry meat in the world.[111]

Some livestock trade statistics for the seven case study countries, for which a full data set is available, are shown in Table 4.3. The first row gives net export figures for the case study countries, net exports being equal to gross exports minus gross imports, in US$ value terms. Trade statistics are measured in current US$ terms rather than at PPP values. The values of all traded livestock products are included in the estimates. While values of net exports of livestock products are positive for Costa Rica, Kyrgyzstan, Mongolia and Turkey, they are negative for Morocco, Uganda and Vietnam. This implies that the first four countries are net exporters, while the last three are net importers. Throughout the Table, net import figures are underlined.

[109] See OIE 2004.

[110] See Owen *et al.* 2004.

[111] See Upton 2009.

Table 4.3: Key trade data for case study countries (2005)

	Costa Rica	Kyrgyz-stan	Mongolia	Morocco	Turkey	Uganda	Vietnam
OIE-Region	*The Americas*	*Europe & Central Asia*	*Asia*	*Africa*	*Europe & Middle East*	*Africa*	*Asia*
Net exports of livestock products (1000 US$)	63,882	3,403	3,688	-73,756	35,198	-2,103	-245,815
Meat Exports/Production or Imports/Consumption*	9.65 %	7.45 %	2.10 %	0.54 %	2.96 %	0.00 %	0.12 %
Milk Exports/Production or Imports/Consumption*	3.36 %	2.29 %	1.83 %	19.05 %	0.05 %	0.41 %	74.58 %
IIT Meat**	3.40 %	1.28 %	11.37 %	17.20 %	2.07 %	79.81 %	92.29 %
IIT Milk**	63.37 %	41.91 %	1.97 %	68.53 %	93.81%	20.16 %	0.92 %
IIT all livestock products**	36.35 %	86.32 %	73.79 %	66.79 %	81.51%	54.55 %	18.84 %

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Notes: Net imports are underlined.
* Rows 2 and 3 give the volume of total exports expressed as a percentage of total production (in metric tonnes) for net exporting countries, *or* the volume of total imports as a percentage of total domestic consumption (in metric tonnes) for net importing countries.
**ITT refers to the Intra-Industry Trade index, which is a measure of a nation's open-ness to trade. The IIT can vary in value from zero, implying that the country is either an exporter with no imports or an importer with no exports, so that no intra-industry trade occurs, to 100 which denotes that imports are equal in value to exports.

The balance of trade for specific items, of meat, milk and eggs and livestock, may differ from that for the total value of traded livestock products. Costa Rica is the only case study country that earns a substantial income from beef and pig meat exports. Much smaller amounts of dairy produce, poultry meat and eggs are also exported. This country benefits from FMD free status, without vaccination, and has a high level of NPS expenditure per VLU in comparison with most of the case study countries. Expenditure on border inspections per VLU is the highest of the countries recording this item (see Table 4.5 below). Turkey is a net exporter of poultry meat and eggs, although the quantities represent only a small proportion of the large national output. The value of these exports probably increases the emphasis placed on NPS expenditures.

Both Kyrgyzstan and Mongolia are net exporters of livestock products, but of relatively small quantities of milk and dairy products from Kyrgyzstan and of bovine and other ruminant meat from Mongolia. Most of this trade is with neighbouring countries, and does not raise serious concerns regarding the achievement of SPS standards.

Morocco, Vietnam and Uganda are all net importers. Morocco imports all types of meat, eggs and dairy products, the latter being the dominant element. Vietnam is interesting in being a net importer overall, particularly of dairy products and some poultry, but is a net exporter of pig meat and eggs. Only a small amount is spent on border inspections per VLU at the central level, and no data are available concerning border inspections that are under the authority of provincial Veterinary Services. There appear to be high risks of cross border disease entry, though border surveillance has recently been enhanced to check the spread of Highly Pathogenic Avian Influenza. Uganda exports small amounts of ruminant meat and eggs but imports pig meat and dairy produce. Amounts recorded are all relatively small and the country is recorded as being close to self-sufficiency in livestock products. No significant expenditure is recorded for border inspection.[112]

The second row of the Table gives the volume of total meat exports expressed as a percentage of total meat production (in metric tonnes) for net exporters of meat, *or* the volume of total meat imports as a percentage of total domestic meat consumption (in metric tonnes) for net importers of meat.[113] These figures give an indication of the importance of trade in meat in relation to domestic production or consumption. These ratios are quite small at under three percent for all net exporters, except for Costa Rica. Despite the relatively high value of its exports, which mainly consist of meat, they only account for about 10 percent of the country's total meat production. Similarly, imports of meat to Kyrgyzstan and Morocco represent only a small proportion of total national meat consumption.

The third row of the Table provides similar estimates for the volume of dairy products exported (measured as metric tonnes of milk equivalent) in relation to volume of production for net exporters, or volume of dairy imports in relation to consumption for net importers. Five countries are net importers and of these Morocco imports a substantial proportion of its national dairy consumption requirements, while Vietnam imports a massive three quarters of the amount consumed. Costa Rica and Kyrgyzstan export small proportions of their national dairy production.

The fourth row of the Table above gives the Intra-Industry Trade (IIT) index for meat, which is a measure of the nation's open-ness to trade in meat products. Calculation is based on the following formula for meat, treated as the *ith* industry.

$$IIT_i = \{1 - [| X_i - M_i | / (X_i + M_i)]\} x100$$

where X_i = value of exports,

M_i = value of imports, and

$| X_i - M_i|$ = absolute value of net exports = trade balance (positive or negative).

The IIT can vary in value from zero, implying that the country is either an exporter with no imports or an importer with no exports, so that no intra-industry trade occurs, to 100 which denotes that imports are equal to exports.[114] Uganda and Vietnam appear to have very high IIT ratios for meat, meaning that their income from meat exports is largely balanced by expenditure on meat imports. In fact Vietnam is a substantial exporter of pig meat, but this is largely balanced by imports of other kinds of meat. These high IIT ratios may be linked with the fact that, for these two countries, their net export values are extremely small in relation to domestic production.

The fifth row gives the Intra-Industry Trade index for dairy products, using the same formula as before. The values for Vietnam and Mongolia are very low. However, those for the three middle-income countries, Costa Rica, Morocco and Turkey are quite high reflecting open-ness to trade in dairy products.

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[112] In Uganda, border inspections are partly conducted by central level staff, and partly by district staff. Related expenditures are included in VS expenditures.

[113] Import figures are underlined in Table 4.3.

[114] Dunn & Mutti 2000.

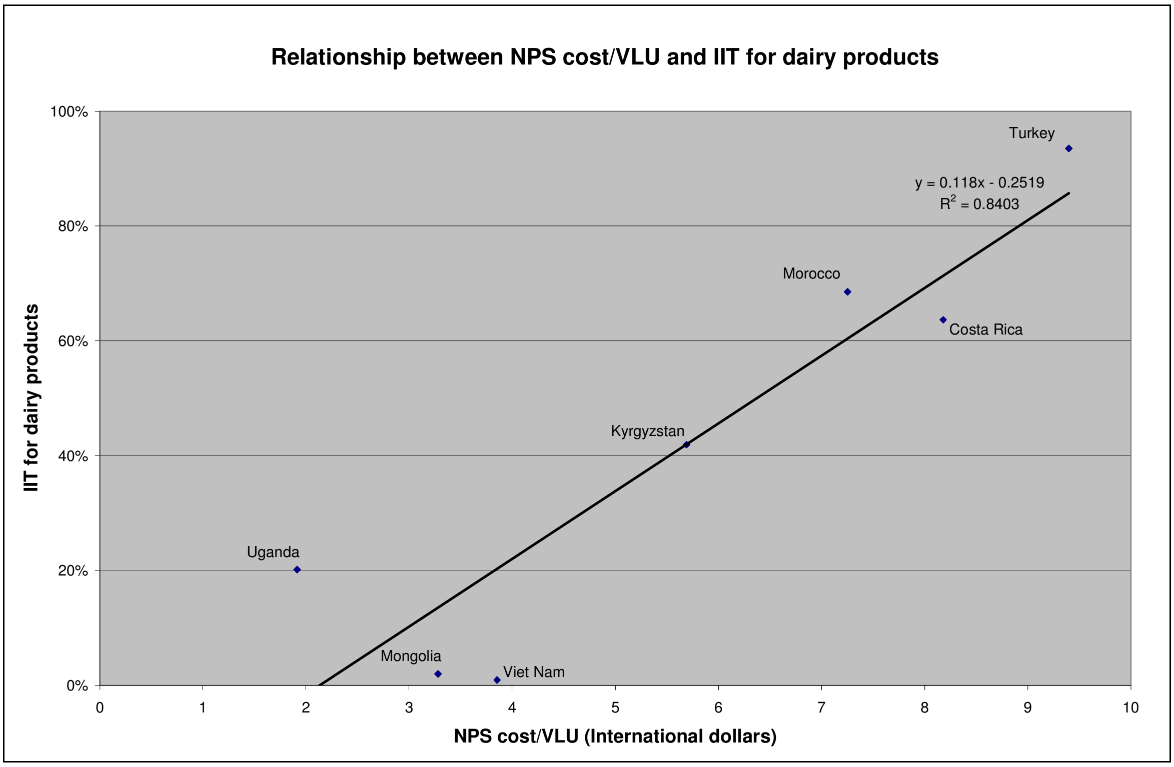
Finally, the sixth row shows the Intra-Industry Trade ratios, in value terms, for the livestock industry as a whole. Most of the figures are quite high, reflecting the scope for countries to exploit their comparative advantage in different livestock products and to benefit from trade.

Some conclusions may be drawn from these results for individual countries. Costa Rica is the main exporting country of the case studies, with net export value for livestock products of almost 64 million US$. Even so the quantity of meat exports is less than 10 % of national meat production. For dairy products the ratio is much smaller. Turkey earns over 35 million US$ net from livestock product exports. However export quantities represent a very small proportion of national meat production while the country is a net importer of dairy products. Morocco is the largest net importer of livestock products, though this represents an insignificant proportion of domestic consumption of meat but a substantially bigger proportion of the quantity of dairy products. Vietnam is another major net importer of livestock products but this relates mainly to dairy products, as the country is marginally a net exporter of meat.

Intra-Industry Trade figures for meat are influenced by the degree of specialisation in different types of meat. As already mentioned, Vietnam is a substantial net exporter of pig meat, but the foreign exchange earned is largely balanced by expenditure on imports of other types of meat, particularly poultry. Uganda engages in very little livestock trade and is largely self-sufficient in meat. Meat exporters with low IIT percentages, such as Costa Rica and Turkey, have low levels of meat imports, whereas net importers with low IIT values, such as Kyrgyzstan, export very little meat. The only possible linear association observed is that between IIT for meat and VLU density. However, an equally strong, but negative association was observed between IIT for all livestock products and VLU density. No clear conclusion can be drawn on these possible associations.

Intra-Industry Trade figures for dairy products (milk equivalent) seem to show a more consistent pattern. Countries with a higher level of NPS cost per VLU, also appear to adopt a more open trade policy for dairy products. The simple regression relating the two variables is shown in Figure 4.4.

Figure 4.4: Relationship between NPS cost/VLU and IIT for dairy products



Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

This relationship may show that countries that are able and willing to spend more on the NPS services, relative to the VLU population, can more readily participate in open trade in dairy products with other countries.

4.2.4. Local ecology and animal health situation

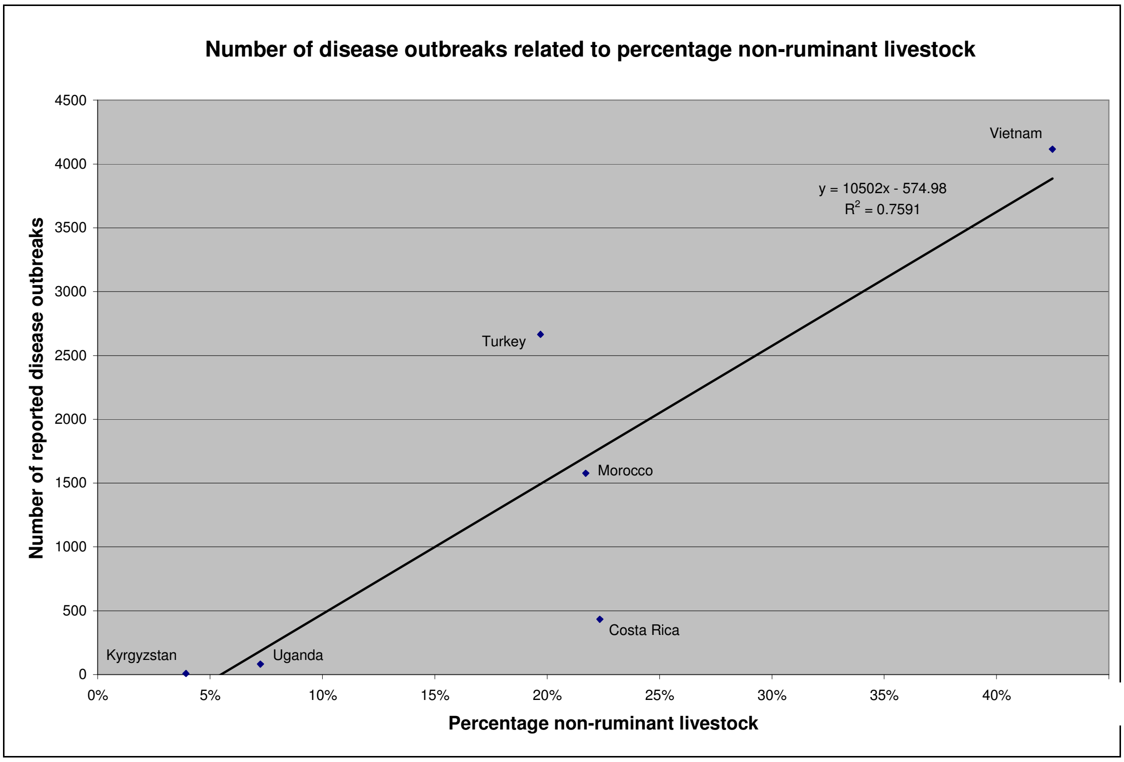
Geographical features of the country, such as the climate, topography and location, together with cultural variables, affect the types of livestock kept and the associated production systems. Disease incidence may also be linked with the presence, or absence, of alternative hosts and vectors of disease. These features can determine the relative importance of different livestock diseases, and the choice of appropriate control measures (see Annex 4). The total costs of National Prevention Systems are likely to depend upon the relative occurrence of different diseases and the choice of preventive control measures.

An instance of a cultural variable is the near absence of farmed pigs in countries such as Morocco and Turkey. Classical Swine Fever is not a problem for livestock in these countries. In contrast, for Vietnam, pigs are the most important source of meat and livestock exports.

There are quite large differences between countries in the relative importance of ruminant, grazing livestock, characteristic of pastoral grazing areas. Their importance is largely due to local climate patterns and agro-ecological zoning. The livestock population measured in VLUs in one country, Mongolia, is almost entirely made up of ruminant stock. In the other six countries non-ruminant livestock (mainly pigs and poultry) make up varying proportions of the total livestock VLU population; Kyrgyzstan 4 percent, Uganda 7 percent, Turkey 20 percent, Costa Rica and Morocco 22 percent, and Vietnam 42 percent. It is clear that agro-ecological conditions, determining the relative emphasis on ruminant and non-ruminant livestock, have a significant influence on disease incidence and, it might be argued, the required level of NPS expenditure. However, no association has been found between incidence of disease outbreaks reported to the OIE and levels of NPS expenditure per VLU. [115]

However, it may be assumed that pig and poultry production is generally more intensive and readily commercialised than ruminant production. Non-ruminant livestock are generally housed at relatively high density in particular localities. For these reasons, the capacity of diseases to spread is relatively greater with pig and poultry production than with those affecting ruminant livestock grazing, at least to the extent that stringent biosecurity measures are not taken by producers. This is demonstrated by comparing the number of disease outbreaks reported to the OIE per year, with the percentage of non-ruminant livestock. The total number of reported disease outbreaks is necessarily a very rough measure, as it includes outbreaks of very different diseases and the validity of the data also depends on the completeness of reporting concerning outbreaks. In spite of these limitations, the scatter-graph below shows a positive association between the percentage of non-ruminant livestock and disease outbreaks.

Figure 4.5: Relationship between reported disease outbreaks and percentage of non-ruminant livestock



Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

[115] It would be interesting to research the existence of a link between the epidemiological situation in a country and the level of NPS expenditures over long time periods, which was not possible in the framework of the present study. However, it appears from the initial research conducted on this issue in the case study countries that the epidemiological situation prevailing in a country is less relevant than the limited availability of financial resources in determining the overall level of NPS expenditures. Some limited influence of the epidemiological situation on NPS expenditures, resulting from the expenditures related to vaccines (e.g. FMD) and compensation of livestock holders (where relevant), could nonetheless be expected. On the other hand, the irregular incidence of epidemic diseases might limit the scope for analysis of trends.

4.2.5. Existence of a private veterinary sector

Arguments presented in section 2.3.1 led to the conclusion that some animal health functions, particularly those relating to prevention and control of serious contagious diseases, require public sector intervention. Other functions, such as the control of low-contagion endemic diseases, clinical diagnosis and treatment, are better suited to private provision. Given this differentiation of responsibilities, private sector veterinarians cannot readily substitute for public sector veterinarians in the National Prevention System. Rather the private and public sector veterinarians are likely to complement each other's activities. The contribution of private veterinarians to the improvement of livestock production is not considered to be part of the National Prevention System as defined for this study, and related expenditures of the private sector have been excluded, for reasons explained in section 2.3.1 of this report. Due to the lack of data concerning private sector spending on veterinary measures and biosecurity in case study countries, it is not possible to identify effects of private veterinary expenditures on total NPS expenditures. However, it is possible to analyse whether or not the strength of the private veterinary sector, as expressed by the number of private veterinarians, has any effects in this respect. The relative strength of the private veterinary sector can be expressed with the ratio of public to private veterinarians. A ratio above 1 indicates a stronger public than private veterinary sector, 1 indicates a numerical parity, and a ratio of less than 1 indicates that there are more private than public veterinarians.

Data from the case study countries concerning the number of public and private veterinarians are provided in the Table below. Because of the above-described effect of per capita income on NPS expenditures, the countries are grouped according to income levels.

Table 4.4: NPS costs and number of public and private veterinarians

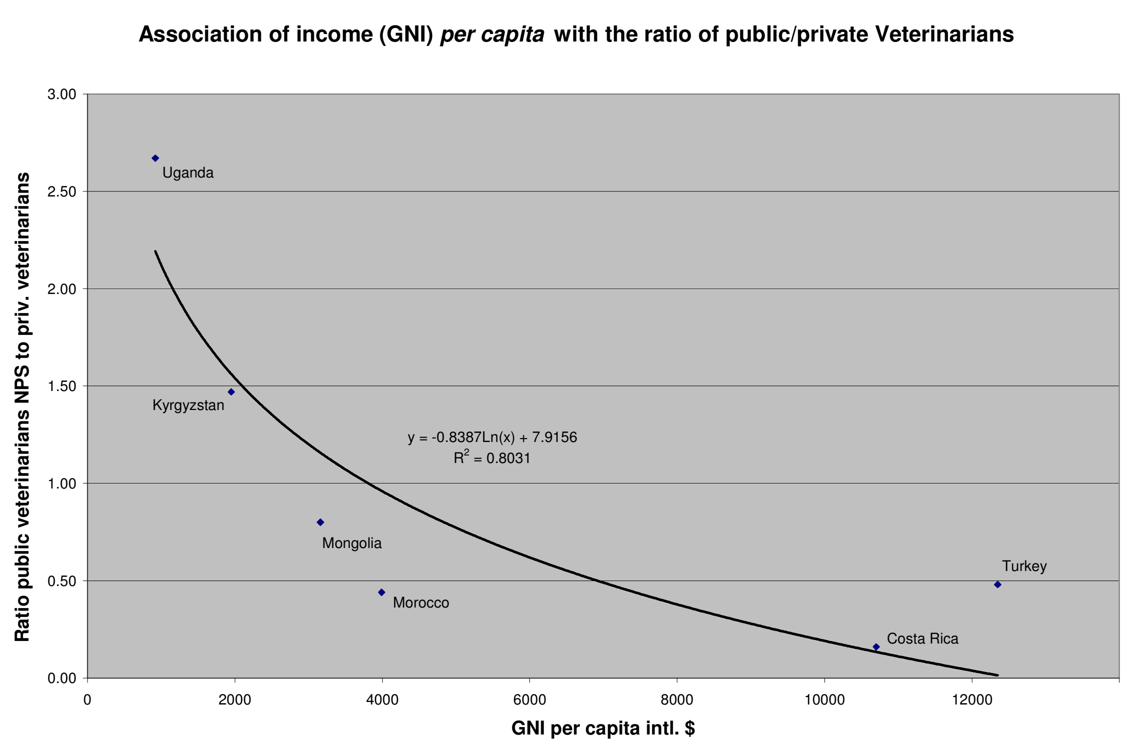
	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	<u>5.69</u>	3.85	3.30	7.25	8.18	9.40	*5.66*
Number public veterinarians NPS	345	1,096	4,272	<u>450</u>	240	117	2,348	*1,267*
Number private veterinarians	129	748	n.a.	561	550	753	4,904	*1,274*
Ratio public to private veterinarians	**2.67**	**1.47**	n.a.	**0.80**	**0.44**	**0.16**	**0.48**	***1.02***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

Note: Median values are underlined.

When analysing the data provided in Table 4.4, there appears to be an association of increasing NPS costs with a decreasing ratio of public to private veterinarians. However, this association is likely to be related to the influence of an increasing income per capita on both the number of private veterinarians and NPS expenditures. The relationship between GNI *per capita* and the ratio of public to private veterinarians is depicted in the following Figure.

Figure 4.6: Relationship between GNI per capita and ratio of public veterinarians NPS to private veterinarians



Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

The Figure above illustrates that the ratio of numbers of private veterinarians, to numbers of public sector veterinarians in the NPS, tends to increase with increasing national *per capita* income. Judged by the results from the sample of case study countries, the ratio of public to private veterinarians appears to be of little value to explain NPS expenditures.[116]

Further light may be thrown on the ratio of public to private veterinarians, by considering the attempted privatization of Veterinary Services launched in many countries in the 1980s. Government budgetary constraints forced reductions in funding for animal health services, reflected cuts in material and equipment supplies, rather than in staff numbers. The development of private veterinary provision generally had limited success. Problems that have arisen include the following (also see Leonard *et al.* 1999):

- The capital costs of establishing a private veterinary clinic, together with a private vehicle, are substantial, while adequate credit may not be available. Future returns are uncertain and less secure than a government veterinary salary;

[116] As shown by Figure 4.6, the overall influence of the level of income on the size of the private veterinary sector appears to be important. It is nonetheless possible that countries with the same income level have different level of private veterinary sector development. It was however not the aim of this study to assess strategies to develop the private veterinary sector.

- As a result, uptake of opportunities has been slow, while practices that have been established generally specialize in treating companion animals in urban areas, or operate in localities where intensive, commercial production systems are established. The more remote rural areas have not been served;
- In many cases government veterinarians have continued to provide clinical services, often for an official or an unofficial fee. In effect they are subsidized, since publicly-owned clinical equipment is already available. Thus the salaries of government veterinarians are supplemented at the expense of possibly undercutting the prices charged by private veterinarians;
- Para-veterinarians, both those employed by the government and those operating privately, can potentially make a valuable contribution to the provision of animal health services. However, limited progress has been made in co-ordinating and integrating their services with those of professional veterinarians in the private sector.

Overall, in developing countries other than in the more intensive areas of commercialized livestock production, little progress has been made in substituting private provision of animal health services for government provision.

This leads to the following conclusion:

4. ***There is no evidence that a stronger private veterinary sector reduces public NPS expenditures in the case study countries.*** The relative strength of the private veterinary sector, expressed as the ratio of public to private veterinarians, appears to be related to the income level of the country. In the case study countries, both NPS expenditures and the relative importance of the private veterinary sector increase with a higher GNI *per capita.*

4.2.6. Other relevant factors

4.2.6.1. Conflict and civil unrest

Violent civil disputes may lead to an array of adverse effects on the control and prevention of animal disease. Adverse effects may include:[117]

- Difficulty in enforcement of quarantine, linked with military and refugee movement;
- Loss of supply lines for materials;
- Increased smuggling;
- Inflows of food aid which might be contaminated;
- Problems in getting access to conflict areas, making it difficult to conduct formal disease surveillance and treatment.

With regard to quarantine, difficulties of enforcement arise, even in the absence of civil unrest, where there are readily negotiable land boundaries, with few border protection posts. Incentives for clandestine immigration and livestock imports exist, where more favourable markets and prices for live animals and their products prevail. Livestock prices are likely to be higher where the major epidemic diseases are controlled. Hence there is a price-driven incentive for animal movements from areas of lower health standards, to those where sanitary conditions are better,

[117] See Otte, Nugent & McLeod 2004.

leading to the potential spread of disease. Furthermore, the owner's costs of quarantine for live animals, and the official or unofficial tariffs payable for regulated imports of livestock products, may themselves provide incentives for illegal import trade.

However, these problems are likely to be intensified where there are border disputes or large movements of refugees, who bring their belongings, including livestock and their diseases, with them. Civil unrest often causes the breakdown of institutional support for border control and quarantine management. It may also be argued that, in conflict situations, investments by the public or the private sector may be seen as more risky and therefore less attractive options for the allocation of funds.

Livestock emergencies, caused by civil unrest and other types of disaster, are being addressed by the LEGS (Livestock Emergency Guidelines and Standards) Steering Group which has overseen the production of the guidelines. The role of the Steering Group is to coordinate the production process, provide quality control, facilitate consultation processes with a wide range of stakeholders, and foster the establishment of a network of interested practitioners.[118]

In parts of Africa, such as Southern Sudan, where civil unrest has led to the breakdown of government Veterinary Services, NGOs have assisted in establishing community-based animal health services and promoting the use of participatory epidemiology methods.[119] In the Middle East, the conflict situation in Gaza and the West Bank creates problems for the prevention and control of Avian Influenza outbreaks. In 2006 the disease risk was seen as serious, with little scope for compliance with OIE International Standards and a serious need for international funding, even then 'seriously constrained due to, largely, the international response to the transition in government'. Today the situation is surely worse.[120]

Few of these problems were reported from the case study countries, although movement of refugees, cross-border migration for economic reasons, and informal trade in live animals are relevant issues in some cases.

It is likely that where associated disease control problems arise, they limit the effective performance, and therefore raise the costs, of National Prevention Systems. However, no quantitative evidence in this respect was available from the case study countries.

This leads to the following conclusion:

5. ***Civil conflict, illegal immigration and informal cross-border trade in live animals impact on public disease prevention.*** Where such problems arise, they are likely to limit the effective performance, and therefore raise the costs, of National Prevention Systems. However, no quantitative evidence in this respect was available from the case study countries.

4.2.6.2. Social concerns regarding the environment and human health

Environmental concerns may arise, for instance, over the culling and eradication of wildlife vectors, as a means of disease prevention. For example, this is the case in Turkey, where there are constraints on the killing of a small sample of foxes as potential rabies vectors for

[118] http://www.livestock-emergency.net/management-funding/index.html.

[119] http://www.vsf-belgium.org/dzf/view/en/589, http://www.vetwork.org.uk/baj-sudan.htm, http://www.fao.org/newsroom/en/news/2004/51774/index.html, http://www.participatoryepidemiology.info/index.html.

[120] http://siteresources.worldbank.org/INTWESTBANKGAZA/Resources/AF.pdf.

monitoring of the impact of oral vaccination. Human health concerns may arise regarding the safety of consuming products of vaccinated animals. All such concerns may impact upon the choice of control measures and the costs of disease prevention. However, there were no specific reports of such concerns affecting veterinary policy and costs of National Prevention Systems in the case study countries.

4.3. Allocation of NPS expenditures

The previous section has analysed possible reasons for differences between the case study countries in National Prevention System expenditures, focusing on factors relating to the overall framework in which the NPS operates, such as land area, livestock population, economic development, etc. This section explores whether the way expenditure is actually allocated across different levels of government, functional units, and types of expenditures influences the overall costs of the National Prevention System.

To adjust for the different livestock populations of the case study countries, operational costs of the National Prevention System are throughout this section expressed on a per VLU basis, i.e. as expenditure in international dollars per Veterinary Livestock Unit. To take into account the association of NPS expenditures with GDP of the case study countries, countries are grouped and analysed according to their *per capita* income level.

4.3.1. Allocation of expenditures to levels of government

Operating expenditures associated with the National Prevention System are incurred either centrally, in or near the main centre of government, or dispersed more widely in provincial, regional or district locations. Organisations at or near the main centre of government include the national Veterinary Authority, the veterinary border inspection agency (or unit) and the central veterinary diagnostic laboratory. De-centralised or sub-national units generally include provincial, district and/or municipal veterinary units and laboratories.

The distribution of expenditures between functional units at central level and those at the sub-national level are given in the Table on the next page.

Table 4.5: NPS operational costs by main functional units across case study countries (in international dollars/VLU, fiscal year 2007)

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda [b]	**Kyrgyzstan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
Central Level								
Central public Veterinary Authority (incl. inspection of live animal markets and slaughterhouses) [a]	1.47	0.16	0.92	1.66	1.65	3.13	<u>1.56</u>	*1.51*
Border inspections	n.a.	0.58	0.03	0.15	0.12	1.65	0.10	*0.44*
National veterinary laboratory	n.a.	0.56	0.07	0.08	0.07 [c]	1.39	0.22	*0.40*
Sub-national level								
Sub-national units of public Veterinary Services (incl. inspection of live animal markets and slaughterhouses)	0.45	3.57	<u>2.72</u>	1.30	4.34	2.01	5.91	*2.90*
Municipal veterinary units	0.00	- [d]	- [d]	0.13 [e]	-	0.00	0.38	*0.13*
Sub-national veterinary laboratories	n.a.	<u>0.82</u>	0.11	n.a.	1.07	0.00	1.23	*0.65*
Total public expenditures	***1.92***	***<u>5.69</u>***	***3.85***	***3.30***	***7.25***	***8.18***	***9.40***	***5.66***
Donor Programmes	0.74	0.83	<u>0.30</u>	0.10	0.29	0.30	0.74	*0.47*
Grand total	**2.65**	**<u>6.52</u>**	**4.15**	**3.40**	**7.54**	**8.49**	**10.14**	***6.13***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Notes: Median values are underlined.

(a) Also includes the expenditures of the Veterinary Statutory Body, where existing and relevant data are available (Costa Rica).
(b) Data relate to fiscal year 2006/7 (from 1.7.2006 to 30.6.2007).
(c) Central coordination unit for laboratory services.
(d) Expenditures related to municipal units (in Vietnam: Communal Veterinary Teams) included in the amount for sub-national units of the public Veterinary Services.
(e) Municipality of Ulaanbataar.

If only the degree of decentralisation of public services is considered, i.e. NPS expenditures at different levels of government, the following picture emerges, as presented in the Table below.

Table 4.6: Allocation of NPS expenditures between central and sub-national level

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
Total NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Land area (000) km^2	241	200	329	1,567	447	51	784	*517*
Central expenditure per VLU in intl. $	1.47	1.30	1.02	1.88	1.84	6.18	1.88	*2.22*
Sub-national expenditure per VLU in intl. $	0.45	4.39	2.83	1.42	5.41	2.01	7.52	*3.43*
Central expenditure as % of NPS costs	**77%**	**23%**	**27%**	**57%**	**25%**	**75%**	**20%**	***43%***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

In most case study countries the centralised expenditure per VLU is consistently between one and two international dollars. The exception is Costa Rica where the cost is much higher at 6.18 international dollars. Expenditure per VLU at provincial, district or municipal level is more variable, ranging from 0.45 international dollars in Uganda to 7.52 international dollars in Turkey. There is similar variation in the centralised expenditure expressed as a percentage of the total NPS expenditure. Although the average is 43 percent, values range from a low, of 20 percent in Turkey, to a high level of 77 percent in Uganda.

The centralised NPS expenditure per VLU, of between one and two international dollars in most cases, appears to be necessary to meet the basic requirements of the national Veterinary Authority, the veterinary border inspection agency or units, and the central veterinary diagnostic laboratory. Also, a significant proportion of the central level expenditure, in most countries, is devoted to the purchase of vaccine (see section 4.3.2.2 below). Exceptions are Turkey, where a significant share of vaccines is produced by the veterinary laboratories and provided for free to the Veterinary Services, Kyrgyzstan, where vaccine purchases are ascribed to decentralised expenditures, and Costa Rica where livestock owners pay most vaccines. In the other four countries the central allocation of NPS expenditure may be partly dictated by the cost of vaccines.

Table 4.6 above also lists in the second row the land area of the case study countries, as the size of the country appears to have some influence on the distribution of expenditures between central and sub-national units. The high central expenditure in Costa Rica is clearly associated with a centralised structure in a relatively small country, where most resources are concentrated in the capital, and other parts of the country are served by relatively small decentralised units. In contrast, the decentralised expenditure of Kyrgyzstan, the second smallest country in the sample, is higher than average, but this is due to the inclusion of costs of vaccination under this heading while, in other countries these charges form part of the central expenditures. Turkey, Morocco and Vietnam, three of the largest countries in area, maintain much larger decentralised expenditures per VLU than their expenditures at the centre, or about three quarters of the total NPS operating expenditure. However Mongolia, the largest of all the case study countries, has a higher degree of centralised expenditure. Livestock population density is sparse and less funding is distributed to the decentralised agencies. The high percentage of centralised spending in Uganda mainly reflects the significant under funding of the overall system, which is especially obvious at the sub-national level.

Hence, although there are exceptions to the rule, there is an apparent tendency for the sub-national expenditures to increase relative to the centralised expenditures with increasing size of the national territory. Apart from these possible influences, the allocation of expenditures between centre and periphery may be decided largely on political considerations. Provided that both central and regional elements are included, the average total cost per VLU may be unaffected by the extent of decentralised expenditure.

This leads to the following conclusions:

6. ***Sub-national expenditures tend to increase relative to the centralised expenditures with increasing size of the national territory.*** A high central expenditure in Costa Rica is clearly associated with a centralised structure in a relatively small country, whereas Turkey, Morocco and Vietnam, three of the largest countries in area, spent about three quarters of the total NPS operating expenditure at the sub-national level. However, there are exceptions to the rule: Mongolia, the largest of all the case study countries, has a higher degree of centralised expenditure. Livestock population density is sparse and less funding is distributed to decentralised agencies. Provided that both central and regional elements are included, the average total cost per VLU may be unaffected by the extent of decentralised expenditure.

4.3.2. Allocation to different types of expenditure

4.3.2.1. Staff costs

Information was collected on total levels of expenditures for staff employed in the operation of the National Prevention System. These include salaries and wages of veterinarians, veterinary paraprofessionals and other technical staff (both civil servants and contract staff). Also included are costs of social welfare contributions and non-wage income, such as payments in kind.

The total sums used for staff costs range from 3.4 million international dollars by Kyrgyzstan to 123.5 million international dollars by Turkey. The distribution is very skewed, with an average of the seven countries of 28.0 million international dollars, and a median (middle value) of only 15.2 million international dollars. As has been stated before, the total expenditure is largely affected by the size of the national economy and more specifically the size of the livestock population. Staff expenditures are therefore expressed as a cost per Veterinary Livestock Unit and as a proportion of the total operational expenditure for the National Prevention System (NPS). Results are presented in the following Table 4.7.

Table 4.7: Expenditures for staff

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Cost per VLU in intl. $ for staff costs	0.59	1.93	1.70	0.63	3.45	6.01	6.95	*3.04*
Percentage of total operating expenditure	**31 %**	**34 %**	**44 %**	**19 %**	**48 %**	**73 %**	**74%**	***46%***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

Staff expenditures per VLU appear to vary with level of *per capita* income. The lowest level applies in Uganda, a low-income country, while substantially higher levels apply in the two upper-middle-income countries, Costa Rica and Turkey. Only Mongolia, with a lower expense than might be expected for its income level, does not follow the trend, partly due to the fact that at district level the local Veterinary Services are run by private Veterinary Services units and related public expenses are a service expenditure and therefore not included in staff costs.[121] It may also be noted that the total NPS operating expenditure for Mongolia is lower than might be expected. Mongolia is large in area and sparsely inhabited by humans, yet with a livestock population, measured in livestock units, which is two and a half times larger than the human population. Public incomes and expenditures are spread thinly over the larger livestock population.

Staff expenditures, expressed as a percentage of the total NPS operating expenditure, vary from 19 % in Mongolia to 73 % in Costa Rica and 74% in Turkey. It has been suggested that both these extremes are unsatisfactory, a more equal allocation of funding between staff and non-staff expenditures being thought preferable.[122] It is argued that where staff expenditures are a low proportion, as in Mongolia, either staff numbers are likely to be inadequate for the NPS requirements and the available physical resources or levels of remuneration may be too low to attract able and well motivated staff. Where staff expenditures are high, in relation to material resources, poor performance of the NPS may occur because of inadequate funding for materials, transport and other resources. From the case study results, it is very difficult to find evidence to support or falsify this conclusion: The upper-middle-income country Costa Rica appears to have both high staff expenditures and comparatively good material infrastructure (as evidenced by indicators concerning vehicles and ICT equipment, see section 5.1.3 below); on the other hand, the low-income country Uganda has both a relatively low share of staff expenditures, and a very inadequate funding for materials, transport and other resources. The problem therefore appears to be complex and conclusions concerning distribution of staff to non-staff expenditure certainly need to consider the income level of the country and the extent to which private veterinarians that conduct public service missions are replacing public veterinarians.

[121] Fees for the services of private veterinarians are discussed in section 4.3.2.3 below.

[122] Cheneau, El Idrissi & Ward 2004.

4.3.2.2. Material supplies

In all countries, except Turkey, the largest component of the total public non-staff operating expenditure for the NPS is the provision of the necessary supply of materials. These include the costs of items such as veterinary drugs, vaccines, office stationery, and fuel for vehicles. The cost of vaccine represents a significant item in several countries. Total expenditures on material supplies for the NPS vary from 1.07 million international dollars in Costa Rica to 24.1 million international dollars in Vietnam. The average for all seven countries is 9.65 million international dollars. Costs of material supplies per VLU, and as a percentage of total expenditure, are given in Table 4.8. In addition costs of vaccines as a proportion of total expenditures and per VLU are given in the Table. Comparable data on vaccine costs are not available for Turkey, since significant quantities of vaccines are produced by public veterinary laboratories and provided free of charge to the relevant VS bodies.[123] In Costa Rica vaccines are purchased privately by livestock owners and are therefore not a relevant cost factor for the public Veterinary Services.

Table 4.8: Expenditures for material supplies and vaccines

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mon-golia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Expenditure for material supplies (incl. vaccines) per VLU in intl. $	1.19	2.94	1.38	1.71	1.96	0.78	0.18	*1.45*
Material supplies (incl. vaccines) as % of total expenditure	**62 %**	**52 %**	**36 %**	**52 %**	**27 %**	**10 %**	**2 %**	***34 %***
Vaccine costs per VLU in intl. $	1.04	1.57	0.84	1.01	1.43	0.02	not separately identified	*0.98*
Vaccine costs as % of total expenditures	**54%**	**28%**	**22%**	**31%**	**20%**	**0.2%**	n.a.	***26%***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

4.3.2.3. Services

Expenditure on services includes fees for accredited private veterinarians who undertake public service missions and, if subcontracted, laboratory diagnostics, communications and training of

[123] Vaccine production costs are operational costs for the laboratories and are therefore included in the total NPS expenditures of Turkey, but cannot separately be identified. It is also unclear to which extent vaccine production is cross-subsidised through commercial activities of the laboratories (such as sales of vaccines to the private sector, conducting DNA test for race horses, etc).

employees. Hire of services accounts for a relatively small proportion of total NPS operating expenditure, a negligible amount in Costa Rica and Kyrgyzstan. Amounts spent on services per VLU are shown in Table 4.9. They are all below one international dollar and range from 0.08 international dollars in Uganda to 0.96 international dollars in Morocco. Amounts are also expressed as a percentage of the total operating expenditure for each country.

Table 4.9: Expenditures for services

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mon-golia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Expenditure for services per VLU in intl. $	0.08	0.01	0.13	0.74	0.96	0.03	0.32	*0.32*
Percentage of total operating expenditure	**4%**	**0%**	**3%**	**22%**	**13%**	**0%**	**3%**	***6%***

Source: Civic Consulting, for sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

In several cases this expenditure mainly relates to service fees for private veterinarians conducting public service missions:

- In Morocco expenditures for private veterinarians who conduct vaccination campaigns on behalf of the public VS account for 0.96 international dollars/VLU or 13% of total operating expenditures, the highest figure for all case study countries;
- In Mongolia 0.44 international dollars/VLU are spent on hiring private veterinarians that are functioning as the lowest VS level, and providing related services, mainly related to vaccination and surveillance;
- In Turkey in total 0.15 international dollars/VLU are paid by the government for private veterinarians to conduct inspections at slaughterhouses.

Case study results do not provide a consistent picture regarding possible effects of these privatisation efforts on total NPS expenditures. Morocco and Turkey both are countries where NPS costs per VLU are higher than the average of their *per capita* income group. In Mongolia, NPS costs per VLU are lower than the average, but this may also be related to other factors than the privatisation of the lowest level of Veterinary Services.

4.3.2.4. Consumption of fixed capital

This category of operational costs relates to the annual reduction in the value of fixed assets, or depreciation, of buildings and equipment. It includes depreciation of offices, laboratories and clinics and that of vehicles, and laboratory and office equipment. After the end of the normal average service life of such fixed assets, the depreciation allowance may be reduced to zero. Total amounts recorded for consumption of fixed capital per VLU are recorded in international dollars and as a percentage of total operating expenditure in Table 4.10. Costs of capital depreciation are generally quite low, at a fraction of an international dollar per VLU. Uganda has an extremely low level of cost and Turkey has the highest. Vietnam is unusual in that this cost represents a large proportion of total operating expenditure, mainly due to significant investments in recent years in the infrastructure of the NPS, including buildings for the public Veterinary Services. The values give some indication of the standard of accommodation of the NPS.

Table 4.10: Expenditures for consumption of fixed capital

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Expenditure for consumption of fixed capital per VLU in intl. $	0.01	0.40	0.53	0.09	0.30	0.43	0.69	*0.35*
Percentage of total operating expenditure	**1%**	**7%**	**14%**	**3%**	**4%**	**5%**	**7%**	***6%***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

4.3.2.5. Compensation of livestock holders for animals culled for disease control purposes

Compensation of livestock holders for animals culled for disease control purposes in Mongolia is low at only 0.02 international dollars per VLU and accounts for less than one percent of the total operating expenditure. In Morocco the expenditure is intermediate, at 0.23 international dollars and accounts for three percent of the total operating expenditure. The highest expenditure on livestock owner compensation was reported from Turkey, where it amounts to 0.74 international dollars and eight percent of the total operating expenditure.

Levels of expenditure on producer compensation for compulsorily culled animals are therefore absent or very low in most of the seven countries. This illustrates the problems faced by developing countries in affording adequate compensation as an incentive for reporting of disease incidence. However, the larger than average amounts spent for compensation of farmers in Morocco and especially in Turkey could be one of the factors contributing to higher than average NPS costs in these countries.

4.3.2.6. Other current expenditures

This last category includes travel costs, per diems, interest payments, subsidies, maintenance costs, and payments for utilities. Amounts recorded for other current expenditure per VLU are recorded in international dollars and as a percentage of total operating expenditure in Table

4.11. Costa Rica and Turkey have the highest levels of these expenditures per VLU at 0.70 and 0.53 international dollars respectively. The lowest levels occur in Uganda, at 0.04 international dollars and Vietnam at 0.003 international dollars. Given that the highest levels of other current expenditures per VLU occur in Costa Rica and Turkey, the two upper-middle-income countries, while the lowest levels are found in Uganda and Vietnam, two low-income countries, it appears that there is a direct relationship with levels of per capita income.

Table 4.11: Other current expenditures

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs in intl. $/VLU	1.92	<u>5.69</u>	3.85	3.30	7.25	8.18	9.40	*5.66*
Cost for other current expenditures per VLU intl. $	0.05	0.40	0.003	0.11	<u>0.36</u>	0.70	0.53	*0.31*
Percentage of total operating expenditure	**2%**	**7%**	**0%**	**3%**	**<u>5%</u>**	**9%**	**6%**	***5%***

Source: Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

The discussion of specific categories of expenditure in the case study countries leads to the following conclusion:

7. ***Spending patterns for different categories of expenditures vary across case study countries, however, this provides little explanation for differences in overall NPS expenditures.*** Levels of staff costs and expenditures such as travel costs appear to be directly related to levels of *per capita* income of case study countries. Considerable differences in spending that depend on other factors are related to three categories: Fees for private veterinarians conducting public service mission (up to 0.96 international dollar/VLU), expenditures for vaccines (up to 1.57 international dollar/VLU), and compensation of livestock holders (up to 0.74 international dollar/VLU). In some other countries, spending for these items is zero or close to zero.

5. Economic indicators linked to Veterinary Services

The country studies conducted in the framework of this study were not only aimed at assessing the costs of National Prevention Systems for Animal Diseases and Zoonoses, and to analyse factors influencing these costs. In addition, the results of the country studies also provide the basis for addressing the second objective of this study, namely to "identify economic indicators closely linked to Veterinary Services in compliance with OIE International Standards on Quality of Veterinary Services which may be later used to further complete and improve the OIE-PVS Tool". This section therefore discusses the following issues:

- The identification of economic indicators closely linked to Veterinary Services in general (section 5.1);
- The identification of indicators linked to Veterinary Services in compliance with OIE International Standards on Quality of Veterinary Services (section 5.2); and
- The possible inclusion of economic indicators into the OIE-PVS Tool (section 5.3).

5.1. Identification of economic indicators linked to Veterinary Services

Economic indicators linked to Veterinary Services can either relate to the total NPS operating expenditure, or to the various functional cost components of this expenditure, such as those of staffing requirements, vaccine provision, veterinary laboratory services and equipment. An additional aim is therefore to identify indicators of the level of provision of these specific components.

All the case study countries received contributions to the NPS expenditures from international donors. Hence, total public NPS expenditures may be measured with, or without, the inclusion of foreign donor funding. For most of the analysis, the donor contribution is omitted, so the indicators relate to the allocation of domestic expenditures only.[124]

In the search for suitable indicators, information was gathered not only from the detailed country case study investigations, PVS Evaluations and literature review, but also from online resources. Economic data were derived mainly from the World Bank and International Monetary Fund databases,[125] livestock data from the FAO agricultural databases,[126] and veterinary data from the OIE animal health database.[127] The methodology adopted was to seek for relationships between NPS expenditures and other variables, relating to the geographical, economic livestock production and veterinary characteristics of each country.

Relationships may be established on logical grounds, such as that between NPS expenditures and scale of requirement, as measured by the total VLU numbers. Hypothesised relationships between variables may be tested by means of scatter-plots, and their strength measured by statistical correlation or regression analysis. These statistical approaches allow an assessment of goodness of fit, measured by the proportion of variation in the dependent variable attributable to the relationship. If the fit is poor, it suggests there is little or no relationship and it is unlikely to provide a useful indicator. All these methods were used, in the course of the study visits and subsequently in desk analysis of the results. Potential indicators are presented below, for the

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[124] For the reasons for not including donor contributions, please refer to section 4.1 above.

[125] World Bank, World Development Indicators database, and International Monetary Fund, World Economic Outlook Database.

[126] FAOSTAT.

[127] OIE World Animal Health Information Database and related publications, such as World Animal Health 2007.

costs of NPS as a whole, and for specific components of the NPS expenditures. For the preparation of this section, a much larger set of potential indicators was scrutinised, many of which proved to be of limited value.[128] We focus, in this section, only on those selected indicators that appear to have value as economic indicators linked to Veterinary Services.

Most of the resulting potential indicators are expressed as the ratio of one (dependent) variable to the other (independent or causal) variable. In some cases the ratio is represented as a proportion or percentage. Care is needed in interpreting these ratios, for instance where there is an element of 'fixed cost' that is independent of the differences in 'variable costs' between countries. In the following section indicators are used in describing levels achieved in the case study countries. When interpreting the indicators, it is important to keep in mind the significant differences between case study countries, both in terms of economic development, and in the degree to which they comply with OIE International Standards on Quality of Veterinary Services (as expressed in PVS results, see section 5.2 below).

5.1.1. Indicators for the costs of NPS as a whole

Four different potential indicators of the relative level of total NPS operating costs are given in Table 5.1 below. The first three relate to alternative evaluations of NPS expenditures as proportions of different measures of size of the economy. The fourth indicator relates to the livestock population.

5.1.1.1. Size of the economy

The first potential indicator relates NPS operating expenditures to the Gross Domestic Product (GDP), which is a measure of the total income generated from national productive activity. This indicator is the percentage of this total devoted to NPS services. The second, potential indicator relates NPS operating expenditures to the value added by agriculture, the latter being the total value of agricultural production minus the value of agricultural inputs purchased from other sectors. Hence the indicator gives NPS expenditure as a percentage of the total contribution of agriculture to the national economy.[129] The third potential indicator shows NPS expenditure as a percentage of the total national government budget, which covers all public sector activity.

All the values are quite small, mostly less than a tenth of one percent for the proportion of gross domestic product, less than a third of one percent for the proportion of agricultural value added and not much higher for proportions of national budgets. For the case study countries total NPS expenditures represent a minor proportion of national income, agricultural value added and national budgets. Nonetheless, the correlations between NPS expenditures and each of the

[128] With data from the seven case study countries, pairs of variables that might be associated were subjected to correlation analysis, to test for strength of association. Values of the correlation coefficient 'r' range from +1 for perfect positive correlation to -1 for perfect negative correlation. An 'r' value of zero implies no linear association. It was therefore assumed that correlations of 0.8 and above or -0.8 and below were worthy of further investigation. In particular, associations between total NPS expenditure and other variables were explored, and between NPS expenditure per Veterinary Livestock Unit and other variables (see Annex 7). Scatter plots were used to identify the form of the relationship in each case, followed by regression analysis, using the line-fit option of Microsoft Excel. The resultant graphs, with regression equations and R^2 values, representing the proportion of the variation in the dependent variable explained, are presented in Figures 4.1 to 4.8 in the previous section. All these analyses only estimate the association between pairs of variables, treating one as dependent on the other in the case of regression. It appears that groups of variables, relating to the size of the economy or levels of per capita income and expenditure, may be inter-related, but estimation of their individual partial effects is not justified given the very small sample size of seven countries.

[129] It would have been also appropriate to relate NPS expenditure to the value added by the livestock sector alone. However, no consistent and accessible data source for the case study countries existed in this respect.

measures of size of the national economy are high. The proportions of NPS expenditure explained by the linear relationship are 90 percent or higher respectively for GDP, agricultural value added and national budgets.

However, the percentage ratios given in Table 5.1 on the following page are not wholly satisfactory as indicators of the NPS expenditures in these countries. For instance the regression line for the GDP relationship, shown in Figure 4.2 (above) does not pass through the origin. The average ratio should therefore not be used for predicting values of NPS expenditures for other countries. Rather, the linear regression model depicted by the trend line in Figure 4.2 could be applied to obtain a first estimate of expected expenditures (see section 6.2 below for a description of the potential and limitations of this approach).

Similar caveats are also relevant when NPS expenditures are expressed as percentages of agricultural value added and national budgets.

Table 5.1: Potential indicators of NPS provision for seven case study countries related to operating expenditures for the NPS

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyzstan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
Total NPS expenditure in millions of intl. $	16.8	10.0	67.3	21.1	46.8	11.2	167.0	*48.6*
NPS expenditures as percentage of GDP								
GDP (PPP) in billions of intl. $	32.8	10.5	221.6	8.4	126.9	46.0	885.9	*190.3*
Total public operating expenditures NPS / Gross Domestic Product	**0.05%**	**0.10%**	**0.03%**	**0.25%**	**0.04%**	**0.02%**	**0.02%**	***0.07%***
NPS expenditures as percentage of agricultural value added								
Agricultural value added in billions of intl. $	9.5	3.5	44.3	1.9	15.2	4.1	79.7	*22.6*
Total public operating expenditures NPS / Agricultural value added	**0.18%**	**0.29%**	**0.15%**	**1.14%**	**0.31%**	**0.27%**	**0.21%**	***0.36%***
NPS expenditures as percentage of national government budget expenditures								
National government budget expenditures in billions of intl. $	6.6	2.6	62.2	3.2	35.2	6.6	190.7	*43.9*
Total public operating expenditures NPS / National budget expenditures	**0.26%**	**0.39%**	**0.11%**	**0.65%**	**0.13%**	**0.17%**	**0.09%**	***0.26%***
NPS expenditures related to number of Veterinary Livestock Units								
Livestock Units (in millions)	8.8	1.8	17.5	6.4	6.5	1.4	17.8	*8.6*
Total public operating expenditures NPS / Number of Veterinary Livestock Units (in intl. $)	**1.92**	**5.69**	**3.85**	**3.30**	**7.25**	**8.18**	**9.40**	***5.66***

Source: Civic Consulting.
Note: Median values are underlined.

5.1.1.2. Livestock population

The concept of a Veterinary Livestock Unit is a tool for aggregating the veterinary care requirements of different livestock species, and is increasingly used in analytical studies of veterinary service and cost standards. The last row of Table 5.1 is used to show the ratios of total NPS expenditures to the number of Veterinary Livestock Units. These ratios have been used, in much of the analysis of preceding sections, as an indicator of the level of NPS provision in relation to veterinary requirements. This indicator appears to be the best available measure for assessment that can readily be calculated once total NPS expenditures have been recorded. The number of Veterinary Livestock Units is also of great relevance for other indicators discussed in subsequent sub-sections, e.g. related to staffing. However, there are also certain limitations of the concept of VLU, which need to be considered when using VLU to analyse the costs of Veterinary Services provision.

Measures of Veterinary Livestock Units are calculated from estimates of livestock populations by species and using conversion coefficients for converting numbers of other livestock species into cattle equivalents, each bovine being valued as one VLU.[130] However, as already mentioned in section 4.2.1.2, this measure lacks distinctions between different types of livestock production system. In poultry production, for instance, there are major differences in the level of biosecurity, health risks and veterinary needs of birds in backyard production systems from those in commercial and industrial systems. These differences, between poultry production systems and between production systems for other forms of livestock, are also associated with size of holding, stocking density on the holding and among the larger population of livestock producers. Ideally VLU conversion coefficients should be adapted according to the prevalent type of production system. In addition, for the large ruminants, large differences in veterinary needs are likely to exist between different age cohorts and between dairy and meat producing animals. Concerns must also arise regarding the omission of companion animals such as dogs from VLU estimates, particularly where rabies is endemic.

There may therefore be some scope for improving the reliability of VLU conversion coefficients by redefining them at an international level, taking into account current experiences in OIE Member States and international organisations concerning the veterinary care requirements of different livestock species in a global perspective. The extent to which different production systems would be taken into account in the calculation of VLUs would also need to consider carefully the issue of data availability. Currently, a key problem faced in trying to improve upon the present systems, is the lack of readily accessible data on distribution of livestock according to production systems, types of livestock within species and so on. Already under the current concept of VLU (which does not take into account differences in veterinary care requirements between extensive and intensive livestock production systems) estimates may differ significantly for a specific country, because figures concerning livestock population differ depending on the source. An improved system of VLU would therefore need to be accompanied by a coordinated effort to provide validated data at the international level.

The discussion of indicators for the costs of NPS as a whole related to veterinary care requirements leads to the following conclusion:

[130] See Annex 8 for a presentation of possible approaches that may be used for the calculation of livestock units.

8. ***The best available indicator for comparative assessments of National Prevention Systems is NPS expenditure per Veterinary Livestock Unit (VLU).*** The ratio of total NPS expenditures to the number of Veterinary Livestock Units has been used in much of the analysis of preceding sections, as an indicator of the level of NPS provision in relation to veterinary care requirements. Measures of Veterinary Livestock Units are calculated from estimates of livestock populations by species and using conversion coefficients for different species. However, there appears to be some scope for improving the reliability of VLU conversion coefficients by redefining them, e.g. by including more species and possibly differentiating conversion coefficients according to production system for some species. A more consistent use of VLU would be significantly supported by a coordinated effort to improve reliability and scope of the data on livestock populations provided at international level.

5.1.2. Indicators related to specific NPS expenditures

5.1.2.1. Staffing

The level of responsibility for animal health carried by each veterinarian on average is measured by the number of VLUs per veterinarian. In this respect veterinary paraprofessionals are also employed and should provide support to those who are trained professionally. Hence another indicator could be based on the ratio of VLUs to all veterinary personnel, professional and paraprofessional. Finally, in some countries other graduates, such as agronomists, are involved in NPS activities and therefore included in the ratio of VLUs to the total public professional staff. In the Table on the next page the following potential indicators are presented:

- Ratios of the livestock population in VLU to the number of public veterinarians, as estimated from OIE data for the entire Veterinary Services, including those engaged in activities that are not considered to be part of the NPS, e.g. livestock production;
- Ratios of the livestock population in VLU to the number of public veterinarians engaged in the NPS activities. While information on the total number of veterinarians in public service is already available from the OIE, numbers employed in the NPS can only be determined from the results of the case study investigations. However, this ratio is more relevant to this report;
- Ratios of paraprofessionals to public veterinarians (inside the boundary of the NPS);
- Ratios of the livestock population in VLU to the total public veterinary staff of the NPS (both including professional veterinarians and veterinary paraprofessionals); and
- Ratios of the livestock population in VLU to the total public professional staff[131] of the NPS.

Ratios of livestock populations, measured in VLUs, to numbers of veterinarians or veterinary staff members serve as indicators of the average level of responsibility faced by each individual. The ratio of paraprofessionals to veterinarians indicates the level of support offered to professional veterinarians. These issues are likely to affect standards of NPS performance.

[131] Numbers of professional staff include veterinarians, non-veterinary graduate personnel, as well as veterinary paraprofessionals (including trained Community Animal Health Workers, livestock inspectors, veterinary technicians, and, in the case of veterinary laboratories, laboratory technicians). Not included is support staff.

Table 5.2: Potential indicators related to staff data

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyzstan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	<u>5.69</u>	3.85	3.30	7.25	8.18	9.40	*5.66*
Total number of public veterinarians (reported to OIE) [(a)]	557	1,315	4,373	n.a.	291	122	3,414	*1,679*
Total number of public veterinarians relevant for NPS	345	1,096	4,272	<u>450</u>	240	117	2,348	*1,267*
Total number of veterinary paraprofessionals relevant for NPS	214	<u>231</u>	11,646	4	639	114	1,751	*2,086*
Veterinary Livestock Units (VLU) in millions	8.8	1.8	17.5	6.4	<u>6.5</u>	1.4	17.8	*8.6*
Ratio of VLU population to the number of public veterinarians (reported to OIE)								
VLU / Total number of public veterinarians (reported to OIE)	**15,831**	**1,343**	**3,998**	n.a.	**22,181**	**11,189**	**5,204**	***9,958***
Ratio of VLU population to the number of public veterinarians relevant for NPS								
VLU / Number of public veterinarians NPS	**25,559**	**1,612**	**4,092**	**14,179**	**26,894**	**<u>11,648</u>**	**7,567**	***13,079***
Ratio of veterinary paraprofessionals to the number of public veterinarians (relevant for NPS)								
Paraprofessionals / Veterinarian NPS	**0.62**	**0.21**	**2.73**	**0.01**	**2.66**	**0.98**	**<u>0.75</u>**	***1.14***
Ratio of VLU population to the number of total veterinary personnel relevant for NPS (veterinarians and veterinary paraprofessionals)								
VLU / Veterinary personnel NPS (veterinarians & veterinary paraprofessionals)	**15,755**	**1,331**	**1,098**	**14,054**	**7,343**	**<u>5,898</u>**	**4,334**	***6,487***
Ratio of VLU population to the number of total professional personnel relevant for NPS (veterinarians, other graduates and veterinary paraprofessionals)								
VLU / Professional personnel NPS	**13,869**	**1,280**	**1,093**	**9,653**	**7,120**	**<u>5,898</u>**	**4,332**	***6,178***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3. Median values are underlined.
Notes: (a) Sum of public veterinarians working in animal health activities, public health activities (abattoirs, food hygiene, etc) and in public laboratories.

It might logically be assumed that numbers of qualified veterinarians would vary directly with the NPS operating expenditures. Hence the number of VLUs per veterinarian would decline with rising expenditure per VLU. This assumption is not well supported by the country case study results. The highest numbers of VLUs per veterinarian, for the whole veterinary service and more specifically for the NPS provision, are found in Morocco, a country with an intermediate level of NPS expenditure per VLU and incidentally a lower-middle income per capita. The lowest number of VLUs per veterinarian exists in Kyrgyzstan which has a modest level of NPS expenditure per VLU and a low income level *per capita*. These ratios of numbers of VLUs to numbers of veterinarians are therefore not reliable indicators of levels of NPS expenditures.

The highest number of paraprofessional support staff, nearly three per veterinarian, are found in Morocco and Vietnam. Under some circumstances, and depending on the total number of veterinary staff members, a high ratio of paraprofessionals to public veterinarians may indicate a lack of public veterinarians for the NPS and a lower level of competence in the system. However, this is likely to depend on the circumstances of the country, including to the allocation of the veterinarians to specific functional unit of the NPS and has not been further explored in this study.

The high number of paraprofessional support staff in Morocco and Vietnam allows a reduction to 7.3 thousand and 1.1 thousand VLU per veterinary staff member (professional and paraprofessional) respectively. This ratio is now lower than those for Uganda and Mongolia, two countries with low levels of NPS operating expenditures.

Finally, if not only veterinarians and veterinary paraprofessionals are taken into account, but also other graduates such as microbiologists, chemists, agronomists which may hold a position in the public NPS, the number of VLU per staff member is further lowered in some countries, with the three most advanced countries in terms of PVS results (see section 5.2) having values of 4,332 (Turkey), 5,898 (Costa Rica), and 7,120 (Morocco) VLUs per professional staff member.

5.1.2.2. Costs of accredited private veterinarians undertaking public service missions

Staff numbers used for the calculation of indicator values in the previous sub-section do not include accredited private veterinarians undertaking public service missions for the NPS, which can be a considerable number (e.g. in Mongolia and Morocco). This is likely to distort the picture somewhat. A possible solutions would be to include the amount of resources spent on private veterinarians undertaking public service missions by calculating the number of equivalent full time posts of public veterinarians that could be funded with the same amount (by dividing the total public expenditures for accredited private veterinarians by the average staff costs for a full-time public veterinarian). On the other hand, this would be a rather artificial way to include this item, and there is a rationale to have separate indicators for both categories: The indicators for VLU per public professional staff presented in the previous sub-section may give the most adequate picture concerning the capacity of the public Veterinary Services to intervene at sub-national level, e.g. for the implementation of emergency measures, whereas a specific indicator for private veterinarians undertaking public service missions gives an indication of the extent that the system is privatised.

It is therefore suggested to use a separate indicator for the public expenditures for accredited private veterinarians undertaking public service missions, expressed on a per VLU basis. Relevant data of case study countries has already been presented in section 4.3.2.3: Expenditures for private veterinarians who conduct vaccination campaigns on behalf of the public VS account for 0.96 international dollars/VLU case study countries in Morocco, whereas

0.48 international dollars/VLU in Mongolia and 0.14 international dollars/VLU in Turkey are spent for services of accredited private veterinarians. For comparison reasons, the following Table also presents the costs per VLU for staff costs:

Table 5.3: Potential indicators related to public expenditures for accredited private veterinarians undertaking public service missions

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Cost per VLU in intl. $ for staff costs	0.59	1.93	1.70	0.63	3.45	6.01	6.95	*3.04*
Public expenditures for accredited private veterinarians in intl. $/VLU	**0**	**0**	**0**	**0.48**	**0.96**	**0**	**0.14**	***0.23***
Public expenditures for accredited private veterinarians / Total NPS expenditure	**0%**	**0%**	**0%**	**15%**	**13%**	**0%**	**1.5%**	***4%***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

The Table also presents the ratio of the public expenditures for accredited private veterinarians and the total NPS expenditures, which can be calculated once total NPS expenditures have been recorded.

5.1.2.3. Costs of vaccines

Data gathered from the case study countries showed that the cost of vaccine purchase represents a substantial proportion of the total NPS operational expenditure in most countries. No comparable data are available for Turkey. The only exception is Costa Rica, where reliance is placed on private provision by livestock owners, so public sector provision is negligible. Vaccine cost as a percentage of total NPS expenditure and per VLU is given for the case study countries in Table 5.4.

Table 5.4: Potential indicators related to vaccine cost

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Total NPS expenditures in millions intl. $	16.8	10.0	67.3	21.1	46.8	11.2	167.0	*48.6*
Expenditure vaccines in millions intl. $	9.2	2.8	14.7	6.5	9.2	0.02	n.a.	*7.1*
Veterinary Livestock Units (VLU) in millions	8.8	1.8	17.5	6.4	6.5	1.4	17.8	*8.6*
Vaccine cost / Total NPS expenditure	**54%**	**28%**	**22%**	**31%**	**20%**	**0.21%**	n.a.	**26%**
Vaccine cost in intl. $/ VLU	**1.04**	**1.57**	**0.84**	**1.01**	**1.43**	**0.02**	**n.a.**	***0.98***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

The main limitation of the first indicator is that, although it shows the proportion of total NPS expenditure ascribed to vaccine provision, it does little to explain the large variation between countries. The main causal factor affecting the level of vaccine cost appears to be the size of the livestock population measured in VLUs. For this reason, the ratio of public vaccine costs to VLU appears to be the more relevant indicator. As suggested in the case of Costa Rica, public vaccine costs may be reduced by reliance on private provision. However, this is unlikely to be generally applicable as a means of cost saving because of the major externalities generated by preventive vaccination that may necessitate public provision, especially where farmer's income limits possible contributions. On the other hand, in case study countries in many cases livestock owners already have to pay (formally or informally) a fee for the application of the vaccine, if not for the vaccine itself, and therefore the level of private contribution needs to be explored carefully and be updated regularly, as very significant resources are used for supply of vaccines.

5.1.2.4. Veterinary laboratories

Money devoted to the operation of national and regional veterinary diagnostic laboratories also accounts for an appreciable amount of the total NPS expenditure. Given the importance of efficiently operated diagnostic laboratories for the monitoring and surveillance activities of the NPS, this indicator should provide a measure of the relative level of provision. Information on this cost item was gathered as part of each country case study. No information was obtained from Uganda, where the laboratory is fully integrated in the central Veterinary Service and no separate budget data were available. However, the amount was likely to be rather low and there appears to be only limited domestic provision of diagnostic laboratory services. Expenditures on veterinary laboratories as a percentage of total NPS operating costs and per VLU are given in Table 5.5.

Table 5.5: Potential indicators for costs of veterinary laboratories

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Total NPS expenditures in millions intl. $	16.8	10.0	67.3	21.1	46.8	11.2	167.0	*48.6*
Expenditures for vet. laboratories in millions intl. $	Very limited	2.4	3.2	0.5	7.4	1.9	25.7	*6.9*
Expenditures for vet. laboratories / Total NPS expendit.	Very limited	**24.2%**	**4.8%**	**2.4%**	**15.7%**	**17.0%**	**15.4%**	***13.3%***
Expenditures for vet. laboratories in intl. $/VLU	Very limited	**1.38**	**0.18**	**0.08**	**1.14**	**1.39**	**1.45**	***0.94***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

The first indicator (public expenditures for veterinary diagnostic laboratories as percentage of total NPS expenditures) yields widely variable results, with a minimum of 2.4 percent for Mongolia and a maximum of 24.2 percent for Kyrgyzstan. An interesting second step would be to conduct further analysis to assess whether there is over-funding of veterinary laboratories in Kyrgyzstan or under-funding in Mongolia or Vietnam, where less than 5% of total NPS expenditures relate to veterinary diagnostic laboratories. Possible reasons include in Mongolia that the Central Veterinary Laboratory is only partly funded by the government, and that the (few and small) laboratories at provincial level are integrated in the sub-national Veterinary Service and are therefore not included in the figure above. In Vietnam, similar reasons do, however, not apply, and costs of regional laboratories are included in the figure provided. If the high laboratory cost of Kyrgyzstan are omitted, the data seem to reflect a trend with lower percentage cost of laboratories in the lower income countries and higher percentage laboratory costs in the relatively higher income countries of Morocco, Costa Rica and Turkey.

The second indicator, public expenditures for veterinary diagnostic laboratories per VLU, also yields widely variable results. However, a sub-group of four of the seven countries provide more homogenous results and spend between 1.14 and 1.45 international dollar per VLU.

5.1.3. Indicators relating to the material infrastructure of the NPS

In order to operate effectively, the Veterinary Services require access to the necessary equipment, for a) transport, b) office information technology and communications, and c) veterinary laboratory equipment. The necessary data, on the items of equipment in the first two of these categories used by NPS staff, were gathered during the case study country visits. Comprehensive and comparable information on the last category, veterinary laboratory equipment, could not be obtained. However, the indicator for veterinary laboratories, discussed above, provides some guidance on the allocation of relevant resources within the system.

For transport, information was gathered on the numbers of cars and motorcycles available for use by NPS staff. An aggregate value for the number of vehicles (hereafter referred to as 'Vehicle Index') was obtained by using the following conversion coefficients: 1 for a car and 0.1 for a motorcycle. These coefficients were derived on the basis of unit cost data collected in the framework of the WHO-CHOICE project.[132] The results, expressed as the number per public veterinarian, are given in Table 5.6.

For office information technology and communications, data were obtained on numbers of computers, photocopiers, fax machines, printers and telephones during the case study country visits. The conversion coefficients used, again largely defined the basis of the above mentioned standard cost data, were: 1 for a desktop computer, 1 for a laptop computer, 0.5 for a photocopier, 0.3 for a facsimile machine, 0.2 for a printer and 0.03 for a telephone. All items, that were functioning and available for NPS use, were recorded regardless of age. The numbers of items of office equipment, calculated in this way per public veterinarian (hereafter referred to as 'ICT Index') are also provided in the Table below.

Table 5.6: Potential indicators for equipment available to NPS veterinarians

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Vehicle Index								
Number of vehicles / Public NPS veterinarian	**0.11**	**0.07**	**0.02**	**0.25**	**0.86**	**1.15**	**n.a.**	***0.41***
Information technology and communications Index								
Number of ICT items / Public NPS veterinarian	**0.32**	**0.22**	**0.24**	**0.37**	**1.98**	**2.67**	**n.a.**	***0.97***

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.

[132] See: http://www.who.int/choice/costs/traded_items/en/index.html.

These results appear to support the assumption that the relatively higher income countries of Morocco and Costa Rica, with relatively higher levels of NPS expenditure per VLU, also have higher levels of access to transport and office equipment.

Both indicators can be of interest when calculating rough estimates of needed investment costs to upgrade the material infrastructure. Based on the WHO-CHOICE database the value of a Vehicle Index of 1 in the Western Pacific Region, for example for a country of the group WPRO-B, is 23,881 international dollar. This means that an upgrade of the vehicles stock in a given country in the Western Pacific Region with a total number of 2000 public veterinarians with a current Vehicle Index of 0.5 to the target level of 1.0 could be expected to trigger investment costs of approximately 23.9 million international Dollars. Of course, this is a very rough estimate only that at a second stage needs to be substantiated with a more detailed analysis of needs and procurement costs.

5.1.4. Indicators for donor funding

The level of donor support, expressed as a percentage of the total NPS expenditure (including the value of donor support) gives a measure of the relative importance of this foreign assistance. Data on levels of donor funding were collected during the case study visits. Results are given in Table 5.7 below.

Table 5.7: Donor funding and its contribution to total NPS expenditure

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyz-stan**	**Viet-nam**	**Mon-golia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
NPS costs per VLU in intl. $	1.92	5.69	3.85	3.30	7.25	8.18	9.40	*5.66*
Total NPS expenditures including donor programmes in millions of intl. $	23.4	11.5	72.6	21.7	48.7	11.6	180.1	*52.8*
Donor funding in million of intl. $	6.5	1.5	5.3	0.6	1.9	0.4	13.1	*4.2*
Donor funding / Total public operating expenditures (including donor funding)	28 %	13 %	7 %	3 %	4 %	4 %	7 %	*9 %*
Donor funding in intl. $/VLU	0.74	0.83	0.30	0.10	0.29	0.30	0.74	*0.47*

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: Median values are underlined.

Proportions of reported donor contributions vary from a high 28 percent for Uganda, a country with a low level NPS expenditure per VLU, down to 3 percent for Mongolia, also a relatively low level NPS expenditure per VLU country. Hence, there is no recognisable association between proportionate contributions of donor support and NPS expenditures, in total or per VLU.

However, given that Kyrgyzstan, with the second highest percentage of donor support, is a low-income country, along with Uganda and Vietnam, there is an apparent downward trend in proportionate levels of donor support with increasing *per capita* incomes. Turkey, with the highest average per capita income of the seven case study countries is exceptional, since it has a higher than expected level of donor support. This is due to substantial EU assistance for Turkey's efforts to qualify for membership. These findings may illustrate a propensity for aid donors to offer more support where it is most needed.

A possible use of the indicator is to assess the level of dependence on outside funding. From the case study countries it appears that for the low-income countries, the high level of dependency on donor assistance could lead to a situation where medium and longer term planning of infrastructural investments are at risk of changes in donor priorities, and a sudden discontinuation of donor support (e.g. because of political considerations) may even threaten the sustainability of the VS.

The analysis of potential indicators relating to NPS expenditures, material infrastructure and donor support leads to the following conclusion:

9. ***A set of specific indicators for NPS expenditures, material infrastructure and donor support can be defined as a basis for further analysis.*** Possible specific indicators for NPS expenditures include:
   - *Indicator for NPS staff relative to requirements:* VLU/Public professional staff of the NPS;
   - *Indicator for vaccines:* Public vaccine costs/VLU;
   - *Indicator for veterinary laboratories:* Public expenditures for veterinary diagnostic laboratories/VLU.

   Specific indicators for material infrastructure of the NPS include:
   - *Vehicle index:* Number of vehicles/Public NPS veterinarian;
   - *ICT index:* Number of ICT items/Public NPS veterinarian.

   Finally, the *dependence on donor funding* can be expressed as a ratio of donor funding to total public operating expenditures for the NPS. All specific indicators are mainly of interest when analysing how specific NPS features compare with other countries.

For a comprehensive overview, all indicators discussed are presented in Table 5.8 on the following page.

Table 5.8: Economic indicators – summary table

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyzstan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
Indicators for the costs of NPS as a whole								
Total public operating expenditures NPS / Gross Domestic Product	**0.05%**	**0.10%**	**0.03%**	**0.25%**	**<u>0.04%</u>**	**0.02%**	**0.02%**	***0.07%***
Total public operating expenditures NPS / Agricultural value added	**0.18%**	**0.29%**	**0.15%**	**1.14%**	**0.31%**	**<u>0.27%</u>**	**0.21%**	***0.36%***
Total public operating expenditures NPS / National budget expenditures	**0.26%**	**0.39%**	**0.11%**	**0.65%**	**0.13%**	**<u>0.17%</u>**	**0.09%**	***0.26%***
Total public operating expenditures NPS / Number of Veterinary Livestock Units (in intl. $)	**1.92**	**<u>5.69</u>**	**3.85**	**3.30**	**7.25**	**8.18**	**9.40**	***5.66***
Indicators related to specific NPS expenditures								
Staffing								
VLU / Total number of public veterinarians (reported to OIE)	**15,831**	**1,343**	**3,998**	**n.a.**	**22,181**	**11,189**	**5,204**	***9,958***
VLU / Number of public veterinarians NPS	**25,559**	**1,612**	**4,092**	**14,179**	**26,894**	**<u>11,648</u>**	**7,567**	***13,079***
Paraprofessionals / Veterinarian NPS	**0.62**	**0.21**	**2.73**	**0.01**	**2.66**	**0.98**	**<u>0.75</u>**	***1.14***
VLU / Veterinary personnel NPS (veterinarians & veterinary paraprofessionals)	**15,755**	**1,331**	**1,098**	**9,653**	**7,343**	**<u>5,898</u>**	**4,334**	***6,487***
VLU / Professional personnel NPS (veterinarians, other graduates & veterinary paraprofessionals)	**13,869**	**1,280**	**1,093**	**9,653**	**7,120**	**<u>5,898</u>**	**4,332**	***6,178***
Public expenditures for accredited private veterinarians undertaking public service missions								
Public expenditures for accredited private veterinarians in intl. $ /VLU	**<u>0</u>**	**<u>0</u>**	**<u>0</u>**	**0.44**	**0.96**	**<u>0</u>**	**0.14**	***0.22***

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*		
	Uganda	**Kyrgyzstan**	**Vietnam**	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**	***Average***
Public expenditures for accredited private veterinarians / Total NPS expenditure	**0%**	**0%**	**0%**	**13%**	**13%**	**0%**	**1.5%**	***4%***
Costs of vaccines								
Public vaccine cost in intl. $ / VLU	**1.04**	**1.57**	**0.84**	**1.01**	**1.43**	**0.02**	**n.a**	***0.99***
Public vaccine cost / Total NPS expenditure	**54%**	**28%**	**22%**	**31%**	**20%**	**0.21%**	**n.a.**	***26%***
Veterinary laboratories								
Public expenditures for veterinary diagnostic laboratories / Total NPS expenditures	**Very limited**	**24.2%**	**4.8%**	**2.4%**	**15.7%**	**17.0%**	**15.4%**	***13.3%***
Public expenditures for veterinary diagnostic laboratories in intl. $ / VLU	**Very limited**	**1.38**	**0.18**	**0.08**	**1.14**	**1.39**	**1.45**	***0.94***
Indicators related to the material infrastructure of the NPS								
Vehicles								
Number of vehicles / Public NPS veterinarian	**0.11**	**0.07**	**0.02**	**0.25**	**0.86**	**1.15**	**n.a.**	***0.41***
Information and telecommunication equipment								
Number of ICT items / Public NPS veterinarian	**0.32**	**0.22**	**0.24**	**0.37**	**1.98**	**2.67**	**n.a.**	***0.97***
Indicators for donor funding								
Donor funding in intl. $/ VLU	**0.74**	**0.83**	**0.30**	**0.10**	**0.29**	**0.30**	**0.74**	***0.47***
Donor funding / Total public operating expenditures (including donor funding)	**28 %**	**13 %**	**7 %**	**3 %**	**4 %**	**4 %**	**7 %**	***9 %***

Source: Civic Consulting.
Note: Median values are underlined.

5.2. Indicators linked to Veterinary Services in compliance with OIE International Standards on Quality of Veterinary Services

The economic indicators discussed in the previous section mainly relate to inputs, i.e. financial and human resources used by the government for the National Prevention System. It would be of great interest for donors and policy makers to relate these inputs to the effects they have in a given country. Cost-effectiveness indicators would link systemic inputs such as NPS expenditures per VLU to systemic effects, i.e. the degree of compliance with OIE International Standards on Quality of Veterinary Services.

Precondition for this linkage is the availability of an indicator for the compliance of Veterinary Services with OIE standards, which varies significantly between countries. As has been discussed in section 2.2, the OIE-PVS Evaluation assesses the degree of compliance with OIE International Standards on Quality of Veterinary Services of a specific country. In principle OIE-PVS Evaluation results are therefore the most appropriate indicators in this respect.

PVS Evaluation results are based on the assessment of four ‘fundamental components’: I. Human and financial resources, II. Technical authority and capability, III. Interaction with stakeholders, and IV. Access to markets. Each fundamental component consists of a number of ‘critical competencies’ that are evaluated by expert assessors on the basis of a list of suggested indicators, for ranking on a scale from 1 to 5.[133]

The indicators, and the resulting assessments of PVS critical competencies, are intended as qualitative, judgemental measures of specific characteristics of Veterinary Services. Scores for different critical competencies are not intended to be averaged, for the assessment of overall performance.

Nevertheless, as stated before, an aggregated PVS measure would be very helpful as it would allow comparison of NPS expenditures with the degree to which the NPS adheres to OIE International Standards on Quality of Veterinary Services. For example, the relationship of PVS results and NPS expenditures could be of interest as a benchmark for performance, if results from a sufficient number of comparable countries were available. NPS expenditures that are much higher per VLU than in other countries reaching similar PVS scores would justify further analysis, either to identify possible inefficiencies, or to identify factors that explain the additional expenditure. Similarly, NPS expenditures that are much lower per VLU than in other countries reaching similar PVS scores would either be interesting study objects concerning best practices, or could provide more insights in (country-specific) factors reducing NPS expenditures.

One possibility to aggregate PVS results which avoids averaging is to determine the most frequent PVS level reached in the different critical competencies of the evaluation. The results of applying this approach are presented in Table 5.9 below.

[133] OIE 2008b.

Table 5.9: Most frequent PVS level for the case study countries

	Low-income countries			*Lower-middle-income countries*		*Upper-middle-income countries*	
	Uganda	**Kyrgyz-stan**	**Vietnam** (a)	**Mongolia**	**Morocco**	**Costa Rica**	**Turkey**
NPS costs per VLU in intl. $	1.92	<u>5.69</u>	3.85	3.30	7.25	8.18	9.40
Most frequent PVS level	<u>2</u>	1	<u>2</u>	<u>2</u>	3	3	<u>2</u>

Source: Civic Consulting. For sources of supporting data, see country tables in section 3.
Note: (a) PVS levels of advancement in the PVS Evaluation Vietnam (from level 0 to 4) were adjusted by Civic Consulting, for the purpose of this study to the scale used in the other evaluations (from level 1 to 5).
Median values are underlined.

The results in the Table indicate that the most frequent PVS level is necessarily a rough indicator only and can distort the picture, as a country that may have a mix of PVS levels of mainly 2 and 3 may end up on a same level as another country having reached mainly levels 1 and 2, if in both cases the most frequent level happens to be 2. The distorting effect of using the most frequent PVS level was also evident in the correlation analysis conducted for the case study countries, and therefore this indicator is not considered to be very helpful in the analysis of National Prevention Systems.

Constructing an average score for PVS Evaluations would be a possibility to avoid these distortions and obtain an effectiveness indicator that is suitable for quantitative analysis. However, this raises methodological concerns, because critical competencies relate to a variety of different issues, reaching from ‘contingency funding’ to ‘traceability’, and the use of averages allocates the same weight to very different critical competencies. This could also lead to distortions, because some aspects of the NPS may be more relevant for the overall compliance with OIE standards than others. A possible solution for this problem would be to develop a weighting scheme that would assign weights reflecting the relative importance given to the different critical competencies, as is a common approach in multi-criteria analysis.[134] The determination of preference functions (weights) for each critical competency could, for example, be defined by an OIE working group of relevant experts. The functioning of a simple multi-criteria analysis is illustrated for fundamental component II (Technical authority and capability) in Table 5.10 below for a hypothetical country Y.

[134] Multi-Criteria Analysis (MCA) is a family of algorithms used to select alternatives according to a set of different criteria and their relative ‘weights’. See European Commission, Directorate General Regional Policy 2008.

Table 5.10: Example of a multi-criteria analysis for fundamental component II (Technical authority and capability) for the hypothetical country Y

	Level of advancement	**Weight**	**Weighted level of advancement**
	Between 1 and 5 (as given in OIE-PVS Evaluation)	Weighting factors between 0.0 and 1.0 (to be developed by expert group)	= Level of advancement x weighting factor
II-1 Veterinary laboratory diagnosis	2	0.10	0.20
II-2 Laboratory quality assurance	3	0.05	0.15
II-3 Risk analysis	2	0.05	0.10
II-4 Quarantine and border security	4	0.15	0.60
II-5 Epidemiological surveillance	…	…	…
II-6 Early detection and emergency response			
II-7 Disease prevention, control and eradication			
II-8 Veterinary public health and food safety			
II-9 Veterinary medicines and veterinary biologicals			
II-10 Residue testing			
II-11 Emerging issues			
II-12 Technical innovation			
Total		Sum of weighting factors is equal to 1	Sum of weighted levels of advancement for fundamental component II (between 1 and 5)

Source: Civic Consulting.

When developing a weighting scheme that would assign weights reflecting the relative importance given to the different critical competencies, the following two alternatives appear to be possible:

1. Prepare weighting factors for the critical competencies of each of the four fundamental components of the OIE-PVS Evaluation Tool (as is illustrated in the Table above for the fundamental component II, technical authority and capability), and combine them into a single multi-criteria analysis for all critical competencies of the OIE-PVS Evaluation Tool. The result would be a weighted PVS average for each fundamental component, complemented by an overall weighted average. This weighted PVS average could be related to the overall NPS expenditures in the country, if such data is available.
2. Refine and regroup all critical competencies of the PVS Tool that are related to a specific key component of the NPS (such as veterinary diagnostic laboratories), and combine the levels of advancement reached for these competencies in a separate multi-

criteria analysis. The result would be a weighted PVS average for each specific key component of the NPS that could then directly be related to the expenditures for these key components.

The discussion of possibilities to assess the degree of compliance with OIE International Standards on Quality of Veterinary Services leads to the following conclusion:

10. ***A quantitative expression of OIE-PVS Evaluation results would be helpful for assessing the degree of compliance with OIE International Standards on Quality of Veterinary Services in a systemic perspective.*** For example, the quantitative relationship between PVS results and NPS expenditures could be of interest as a benchmark for performance, if results from a sufficient number of countries were available. However, there is doubt about whether the use of average PVS scores to summarise PVS results is appropriate, as the PVS Tool is developed as a qualitative tool. In future refinements of the PVS Tool, it could therefore be considered to introduce a more quantitative approach. Also, due to the cross-cutting character of several of the critical competencies used for the PVS Tool, it is currently difficult to correlate the costs for key NPS elements (e.g. veterinary diagnostic laboratories) to the results of a sub-set of PVS critical competencies related to this NPS element. It could therefore also be considered to refine and group critical competencies to allow a more direct correlation of PVS results and costs for key elements of the NPS.

5.3. Possible inclusion of economic indicators into the OIE-PVS Tool

In principle, all economic indicators presented in the previous sections 5.1 and 5.2 could complement the OIE-PVS Tool to allow for a better understanding of the total costs of National Prevention Systems, the costs of specific elements of the systems and the relationship between these costs and the degree of compliance with OIE International Standards on Quality of Veterinary Services as expressed in the results of the PVS Evaluation. This would in the mid to long term likely increase the understanding of the economics of National Prevention Systems and provide a basis for developing more cost-effective systemic approaches for preventing and controlling animal diseases.

The selection of the most suitable indicators to be integrated in practice into the PVS Tool or not are therefore not a question of whether or not they increase the understanding of the system – they do – but rather a question of how feasible it is to collect relevant data during the limited period of a PVS Evaluation visit, and how to interpret the data collected. These questions are addressed in the following section, which presents main conclusions of the study, and analyses ways how study results could be applied to other countries.

6. Conclusions

This section presents overall conclusions from the case studies presented in section 3 of this report and analysed in depth in section 4, as well as the discussion of economic indicators for National Prevention Systems discussed in section 5. It is structured as follows:

- Summary of main results from the case studies concerning the costs of National Prevention Systems for Animal Diseases and Zoonoses (section 6.1);
- Analysis of possibilities to apply the results of the case studies to other countries (section 6.2);
- Possible future approaches for integrating economic indicators into PVS Evaluations (section 6.3).

6.1. Main results of the country case studies

The primary aim of the country case studies was to provide estimates of the costs of their National Prevention Systems for Animal Diseases and Zoonoses. After a review of relevant literature, and detailed discussions, a methodology for the cost assessment was developed that is described in detail in section 2 of this report. Questionnaires were then designed for collecting data and sent to a sample of countries that agreed to collaborate with the study and represented the five OIE global regions. Finally, the core expert team conducted field visits to eight countries to collect data from the main functional units of the National Prevention Systems (NPS) concerning expenditures in the basis year 2007. In the event, full data sets were obtained from seven case study countries: Uganda, Kyrgyzstan, Vietnam, Mongolia, Morocco, Costa Rica and Turkey.

Total public sector NPS expenditure, net of donor assistance, was assessed for each of the seven countries. Their values range from 10.0 million international dollars for Kyrgyzstan to 167.0 million international dollars for Turkey. The average for the case study countries is 48.6 million international dollars but, because the sample of countries is so small and the inter-country variation so large, this figure is not a useful indicator of costs for other countries. In fact the variation between countries in total NPS expenditures, together with funding for other areas of public service provision, is likely to depend upon the relative sizes of their national economies. For these seven countries there appears to be a direct relationship between Gross Domestic Product (GDP) and total NPS expenditures.

A more appropriate measure of the comparative costs of the NPS is obtained by relating them to the size of the livestock sector as measured in Veterinary Livestock Units (VLUs). The VLU conversion factors for different livestock species are supposed to reflect the relative requirements for veterinary animal health services. Levels of total NPS expenditures per VLU vary substantially between countries, from 1.92 international dollars per VLU in Uganda, to 9.40 international dollars per VLU in Turkey. The overall average for the seven countries is 5.66 international dollars. Levels of total NPS costs per VLU are likely to depend upon national average levels of *per capita* incomes, or GNI *per capita.* This generally appears to be the case. Uganda, Kyrgyzstan and Vietnam all qualify as low-income countries. The average NPS cost per VLU, for this group, is 3.82 international dollars. The average for the two lower-middle-income countries, Mongolia and Morocco, is 5.28 international dollars, while that for the two upper-middle-income countries, Costa Rica and Turkey, is 8.79 international dollars.

The measure of NPS costs used in the above calculations is net of donor assistance. Among the low- and lower-middle-income countries, the additions of donor assistance to total NPS expenditures per VLU, range from an extra 0.83 international dollar in Kyrgyzstan, down to

0.10 international dollar in Mongolia. When the additional donor funding is included, the numerical ranking of the countries is unchanged, except that the total for Uganda now exceeds that for Mongolia. The average NPS cost per VLU for the three low-income countries is increased to 4.44 international dollars, while that for the pair of lower-middle-income countries rises to 5.47 international dollars. The average for the upper-middle-income countries is 9.31 international dollars.

As already discussed, the inter-country variation in total public operating NPS expenditures per Veterinary Livestock Unit may be explained in part by differences in national *per capita* incomes. Higher income countries can more readily afford higher NPS expenditures. However, there are quite large discrepancies between countries within income groups due to other causes. The use of average NPS expenditures per VLU for the relevant per capita income group, as indicators of normal NPS expenditure levels, should provide more precise guidance than the use of a single overall average for all the countries. Incorporation of the values of donor programmes in the total NPS expenditure figures does not alter this conclusion.

Attempts have been made to explain why the NPS expenditure per VLU is lower than average in some countries and higher than average in others. The fairly low NPS expenditure per VLU in Uganda may on the one hand be associated with a largely ruminant livestock population, no major livestock exports and a highly centralized National Prevention System. On the other hand, the system appears to be significantly under funded at all levels, which is likely to be the main reason for the comparatively low expenditures. Higher NPS expenditures in Kyrgyzstan may be associated with minor exports of dairy produce from the mainly ruminant livestock population, and a more decentralized National Prevention System, as well as a large staffing compared to the number of livestock in the country. Vietnamese expenditure per VLU is average for a low-income country, but the country is distinguished by very dense human and animal populations, mainly smallholder production and a high proportion of non-ruminant pigs and poultry, some of which are exported.

Mongolia in contrast has a low level of NPS expenditure per VLU associated with a sparse population of ruminant livestock and an even sparser human population with a ratio of nearly 2.5 VLUs per inhabitant. Expenditure on the National Prevention System per VLU in Morocco is higher, and may be linked with a denser livestock population and a greater emphasis on poultry production, as well with a 21% higher per capita income (although still belonging to the same income group). In Costa Rica NPS costs per VLU are similar, but this country, though small in area, is a significant exporter of livestock products, so SPS considerations could be important. Turkey, a much larger country, is an exporter of poultry products and has a decentralized NPS service with significant staff levels at sub-national level.

6.2. Applicability of study results to other countries

6.2.1. Measuring total NPS expenditure

The detailed estimates of the National Prevention System expenditures in the seven case study countries[135] are not readily available from official records and accounts. A methodology was therefore devised to gather expenditure data directly from the relevant functional units of the National Prevention System, both at central and at sub-national level. For this aim, country

[135] Data sets for two other countries, Romania and Uruguay, were partly incomplete and could not be compared with the seven countries for which a full data set was available (Costa Rica, Kyrgyzstan, Mongolia, Morocco, Turkey, Uganda, and Vietnam).

visits of members of the core team of experts were necessary. Reliance on communication with local correspondents or experts, as well as with a dedicated contact point of the government, proved to be helpful, but less effective if not complemented by a country visit, in spite of a generally very high level of support of the participating institutions in the country. The main reason was the difficulty to apply the data collection methodology in a consistent manner across case study countries, which is by definition difficult to achieve with local correspondents. Therefore, there appears to be no easy alternative to the method of direct recording of expenditures through country visits of an experienced expert team (not unlike the approach chosen for the PVS Evaluation) for providing *precise measurements* of NPS expenditures. However, the results of the study point to a possibility of *estimating* NPS expenditures with easily available data.

6.2.2. Estimating total NPS expenditures

With the measures of NPS expenditures for the seven case study countries, together with published estimates of GDP, an apparently strong linear association has been identified between the two variables. This finding is important since it seems to demonstrate that levels of NPS expenditure are largely determined by national income levels or ability to pay. The relationship with GDP explains 97 percent of the variation in NPS expenditures between countries (see Figure 4.2). The regression equation is:

$$y = 0.1756x + 15.19$$

Where *y = NPS expenditure in millions of international dollars; and*
x = GDP in billions of international dollars.

This implies that there is a fixed cost of 15.19 million international dollars incurred regardless of the level of GDP. In addition, for each additional billion international dollar increase in GDP there is a corresponding increase in NPS expenditure of 175.6 thousand international dollars. This formula might therefore be used to obtain estimates of NPS expenditures in other countries for which GDP values are available. As the level of total NPS operating expenditure per VLU is the best available indicator of the importance ascribed to NPS provision, the total NPS expenditure can therefore be used to calculate expenditure per VLU based on available data on the livestock population.[136] It is important to note that the above equation provides a rough estimation of the likely current level of funding of the NPS in a given country only. It does not in any case determine the optimal level of NPS expenditures in a given country and should not be used for such purposes.

The use (and limitations) of this formula may be illustrated with the example of Vietnam.

First step – Estimating NPS expenditure on basis of GDP: The GDP was 221.61 billion international dollars in 2007. Hence the estimated NPS expenditure for this year is equal to:

0.1756 x 221.61 + 15.19 = 54.10 million international dollars

[136] In spite of the indisputable value of using VLUs in this context, there may be a case for reviewing and improving the definition of the VLU conversion coefficients. The apparent relationship between percentage of VLUs ascribed to non-ruminant livestock (pigs and poultry), and the number of recorded disease outbreaks, discussed in section 4.2.4 of this study, suggests that the VLU coefficients for pigs and poultry would possibly need to be adapted to reflect the higher need for veterinary care. See also the discussion of this issue in section 5.1.1.2 of this report.

This estimate may be compared with the measured NPS expenditure of 67.36 million international dollars, so the actual value deviates from the predicted value by 13.25 million international dollars (or 24% of the estimated expenditure).

Second step – Calculating NPS expenditure per VLU: Once an estimate of the total NPS expenditure has been obtained through the approach described as a first step, it can be expressed on a per Veterinary Livestock Unit (VLU) basis, to adjust for the scale of requirement for veterinary animal health services. Data on livestock numbers are already available from published sources, such as FAOSTAT. However, it may be advisable to check the figures against other estimates from the OIE database, PVS Evaluations or from other sources. Livestock numbers are then converted into VLUs using the existing OIE conversion coefficients.

Since Vietnam has a livestock population of 17.48 million VLUs, the predicted NPS expenditure per VLU is estimated to be 54.10/17.48 = 3.09 international dollars. This is somewhat smaller than the actual value of 3.85 international dollars.

Third step – Comparing PVS Evaluation results with results of countries with similar NPS expenditure per VLU: In a final step the predicted NPS expenditure per VLU could be used to compare the results of the PVS Evaluation of the specific country (in this case Vietnam) with the results of the PVS Evaluations of other countries that are in a similar range of estimated NPS expenditures per VLU. This would allow comparisons between countries, that, from their level of expenditure per VLU, are realistic points of reference.

The comparison of the results of PVS Evaluations among countries spending approximately similar amounts on their NPS per VLU also allows the identification of outliers, i.e. countries that have either considerably better or worse PVS results than other countries spending similar amounts per VLU on their NPS. Alternatively, countries reaching a similar level of advancement as measured by the PVS Evaluation could be grouped together, and estimated values for NPS expenditure per VLU could be compared.

Deviations of countries with similar PVS results from the mean value of NPS expenditure per VLU may be explained in part by differences in average *per capita* incomes, measured by GNI *per capita*, again reflecting the impact of national income (per person) on the ability to finance NPS expenditure. Other features such as size of land area, population or VLU numbers, trade patterns, ecological influences on types of livestock and disease incidence, conflicts and civil unrest, environmental and human health concerns and the extent of privatisation and decentralisation may also influence the level of NPS expenditure per VLU. However, it was not possible to quantify these other effects. Finally, deviations could relate to specific inefficiencies (for countries having considerably higher NPS expenditures per VLU than comparable countries), or relate to the application of very efficient approaches (for countries having considerably lower NPS expenditures per VLU than comparable countries).

Of course, to analyse possible reasons for the deviations, the estimation of NPS expenditures on basis of GDP would not be sufficient due to the limitations of the method (see next section), and a detailed measurement of the NPS expenditures of the specific country would need to be conducted.

This leads to the following conclusion:

11. ***The strong linear correlation between GDP and NPS expenditures for the case study countries can be used to estimate current National Prevention System expenditure.*** The relationship with GDP explains 97 percent of the variation in NPS expenditures between case study countries. The regression equation might be used to obtain estimates of NPS expenditures in other countries for which GDP values are available.[137] The estimated total NPS expenditure can be used to calculate expected NPS expenditure per VLU. However, this approach provides a rough estimation of the likely current level of funding of the NPS only, and does not in any case determine the optimal level of NPS expenditures in a given country.

6.2.3. Limitations of using total NPS expenditures as benchmark

6.2.3.1. Methodological limitations of estimating NPS expenditures

The basis for the formula for estimating NPS expenditures presented above (as well as the quantitative analysis presented in the previous sections) is a statistical correlation and regression analysis of the data obtained through the country studies. The resulting findings have to be interpreted with care, because of certain limitations regarding the size of the sample and the way it was constructed.

The number of case study countries that could be included in the sample is relatively small (seven countries), partly caused by limited timeframe and resources, but mostly due to the fact that not all the countries that cooperated for the study could supply the necessary data to compile a full data set. As a result of the small number of case study countries, relationships that appear to be quite strong in explaining a high percentage of the variation in the dependent variable, can still have considerable sampling errors. This means that the observed relationship could have occurred by chance even if no association existed. The study team has therefore applied all possible caution in interpreting the results, and has only presented those findings that appear to be supported not only by the statistical analysis, but also by a thorough qualitative analysis of facts.

Furthermore, the sample of countries was not selected at random from the global population of nation states, but chosen only from those countries that already had an OIE-PVS Evaluation done and declared their willingness to collaborate among other selection criteria. This (unavoidable) limitation increases the error margins for predictions of total and individual component NPS expenditures for other countries, especially if predictions are extrapolated outside the range of the distribution of NPS expenditures from the seven country studies (e.g. for very large, or higher income economies).

In consequence, the only reliable and accurate method of obtaining data on NPS expenditures in other countries currently available is by means of direct measurement, using the methodology

[137] The regression equation implies that for NPS expenditure there is a fixed cost of approximately 15 million international dollars incurred regardless of the level of GDP. In addition, for each additional billion international dollar increase in GDP there is a corresponding increase in NPS expenditure of 176 thousand international dollars.

developed for this project (see section 2 and Annex 6 for a description of the approach used for collecting data from case study countries).

6.2.3.2. General limitations of using NPS expenditures as a benchmark

In addition to these methodological limitations caused by the sample size, study results raise questions concerning the possibility to use country study data on total NPS expenditures as benchmark for other countries. The low number of countries available at the outset of the study that had PVS Evaluations reports finally released, and the need to cover all OIE regions, led to a selection of countries that comply to varying degrees with OIE International Standards on Quality of Veterinary Services. Some of the selected countries have a low level of advancement in most PVS critical competencies, others reach higher levels, but are still not fully in line with the standards. This indicates that the levels of organisation, resources and means of the Veterinary Services in these countries may not always allow early detection and rapid response in case of suspicion of outbreak of a notifiable disease, and current NPS expenditures are likely to be insufficient. Results from the case study countries therefore mainly provide a better understanding of the factors affecting NPS expenditures, but they cannot be used as a benchmark value for other countries that wish to identify expenditure levels needed to comply with OIE standards.

One way to remedy this problem would be to do a larger study of the costs of National Prevention Systems and to obtain expenditure data from countries achieving higher level of compliance with OIE standards in the PVS Evaluations with most scores between 4 and 5 (including some high income OECD countries). Collection of NPS expenditure data from a larger sample of countries would also reduce the above-described limitations of study findings. Ideally, a sample of at least thirty countries would allow more precise estimation of performance indicators and investigation of the combined effects of multiple factors on the levels of NPS expenditure.

However, a major problem with extending the approach of this study to a sample of thirty or more countries is that this would be a rather costly option, especially because such data would only present a description of NPS expenditures for a specific year and would need to be updated after a certain period of time.

The question remains whether a larger sample is likely to lead to widely applicable benchmark values for total NPS expenditures. Initial results from Uruguay and Romania, which have higher PVS levels than the other case study countries, appear to hint to widely varying NPS expenditures per VLU for these two countries, although unfortunately data limitations do not allow for a final conclusion in this respect.

Clearly a ‘gold standard’ or quality benchmark figures are needed for comparison of NPS expenditures, but because of the large social, economic, geographical and livestock population differences between countries, it is doubtful whether uniform benchmark values for total NPS expenditures per VLU are likely to be globally applicable. It may therefore be more appropriate to focus on regional rather than on global benchmark figures. Also, as National Prevention Systems are made up of a large number of different components, assessments may be more effective if focused on key elements (as is the approach used in the PVS Tool).

Therefore a more gradual and selective approach appears to be recommendable to derive benchmark values, which could serve as guidance for country governments and donors for allocating NPS expenditures effectively and efficiently. This approach consists of four steps:

1. Improve base data collection to allow for meaningful comparisons between countries.

2. Compare countries in specific OIE regions and sub-regions to minimise social, economic, geographical and livestock population differences.
3. Focus on key elements of the National Prevention System (such as veterinary diagnostic laboratory facilities or expenditure on and use of vaccines).
4. Collect regional benchmark values for the costs of key elements of the NPS, during the PVS Evaluation visits and from other sources.

This possible approach is further discussed in section 6.3 (below).

The conclusions from the previous paragraphs can be summarised as follows:

12. ***A 'gold standard' or quality benchmark figures are needed for comparison of NPS expenditures between countries, but assessments may be more effective if focused on key elements rather than on the total NPS expenditure at national level.*** The results of this study suggest a gradual approach to derive benchmark values that provide guidance to countries for allocating their NPS expenditures effectively and efficiently:
- Improve base data collection to allow for meaningful comparisons between countries;
- Compare countries in specific OIE regions and sub-regions to minimise social, economic, geographical and livestock population differences;
- Focus on key elements of the National Prevention System (such as cost of surveillance, border inspection and diagnostic laboratory facilities);
- Collect regional benchmark cost data for key elements of the NPS, during the PVS Evaluation and PVS Gap Analysis visits and from other sources.

6.3. A roadmap for integration of economic indicators into PVS Evaluations

6.3.1. Possibilities to improve base data collection

The country studies conducted for this study have documented a large variety of data availability issues concerning base data such as livestock numbers and veterinary personnel. Economic analysis of National Prevention Systems for Animal Diseases and Zoonoses could be significantly furthered with improving the reliability of global base data, which would also facilitate integrating economic indicators into PVS Evaluations.

6.3.1.1. Livestock and VLU data

This study confirms that the best available indicators for comparative assessments of National Prevention Systems are defined on a per Veterinary Livestock Unit (VLU) basis. Measures of Veterinary Livestock Units are calculated from estimates of livestock populations by species and using conversion coefficients for different species. A more consistent use of VLU would be supported significantly by a coordinated effort to improve reliability and scope of the data on livestock populations provided at international level. Currently, livestock data from available sources such as FAOSTAT and the OIE WAHID database can differ significantly, and this can potentially distort the analysis.

In addition, as has been discussed before (see section 5.1.1.2), there appears to be some scope for improving the reliability of VLU conversion coefficients by redefining them, e.g. by including more species and possibly differentiating conversion coefficients according to production system for some species. The latter aspect would, however, depend on the possibility to make available global livestock data in this respect, which appears to be a challenge in itself. A redefined VLU would therefore necessarily be a compromise between the aim to represent a valid measurement of veterinary requirements and the need to allow its application in practice.

6.3.1.2. Veterinary personnel

Currently, the only data source available concerning veterinary personnel is the data reported to the OIE from member countries. However, the analysis in the case study countries made clear that reporting is not always accurate, and the reporting format does not allow differentiating between public veterinarians of the Veterinary Services working on prevention, surveillance and control and other public veterinarians working e.g. on livestock production issues (such as genetic improvement of livestock). In addition, in several of the case study countries the central public Veterinary Service is not aware of the number of veterinary personnel working at the sub-national level, and this again is problematic both in terms of comparability of data from different countries and also from a disease management perspective. It appears to be reasonable that a precondition for improving a National Prevention System at any level of expenditure would require that the central Veterinary Service has reliable information on the staff resources available at sub-national level e.g. for emergency measures. It is therefore recommendable that governments develop a database of staff numbers of the public Veterinary Services across all levels of government. This could be encouraged by revising the reporting format for the annual OIE World Animal Health Report. A possible reporting format would provide the following categories:

- Differentiate between *public and private* veterinary personnel
- Differentiate the *categories* of veterinary personnel paid from the public budget
    - Veterinarians in the public Veterinary Services
    - Other university graduates in the public Veterinary Services
    - Veterinary paraprofessionals/technicians (including laboratory technicians) in the public Veterinary Services
    - Accredited private veterinarians/paraprofessionals paid for public service missions (full time or part time)
- Differentiate the *type of activity* of the personnel
    - Animal health (prevention, surveillance and control, including inspection of animal markets)
    - Public health (abattoirs, inspection of meat, dairy and livestock processors, not including food safety at consumption level)
    - Veterinary diagnostic laboratories
    - Animal production (e.g. livestock improvement, farmer's support programmes)
    - Veterinary research, universities and academic institutions
    - Other

Although collection of such data would require additional efforts by member governments, this would hugely improve the basis for any future economic assessment of the National Prevention System, as staff costs account for up to three quarters of NPS operating expenditures in the case study countries. Alternatively, personnel figures could be collected during the PVS Evaluation visit on basis of data from the central VS and a sample of sub-national VS units, as was the approach during the country visits conducted for this study. However, this would imply a considerable effort by the evaluation team, which is unlikely to have the relevant time for this exercise available.

An indicative template for a possible new reporting format OIE World Animal Health Report is presented on the following page (Table 6.2). It would need to be reviewed by an OIE expert group, and would need to be accompanied by a clear definition of reporting categories. The template is based on the minimum set of functional units of the National Prevention System for which data could be collected during the case studies.[138] This is indicated in the Table 6.1 below:

Table 6.1: Personnel of National Prevention System by functional unit

<table>
<tr><th rowspan="3">Level of government</th><th colspan="4">National Prevention System</th></tr>
<tr><th colspan="3">NPS public employees according to veterinary function</th><th rowspan="2">Accredited private veterinarians and paraprofessionals undertaking public service missions paid by public budget</th></tr>
<tr><th>Animal health (prevention, surveillance and control)</th><th>Public health (abattoirs, processors)</th><th>Veterinary diagnostic laboratories</th></tr>
<tr><td>Central level</td><td colspan="3" rowspan="2">Number of veterinarians, other university graduates, and veterinary paraprofessionals/technicians in the public Veterinary Services</td><td rowspan="2">Number of accredited private veterinarians/ paraprofessionals (full or part time)</td></tr>
<tr><td>Sub-national level</td></tr>
</table>

Source: Civic Consulting.

[138] The functional units are slightly simplified in the light of the results from the fieldwork. For example, border inspection is not listed as a separate function (but included in animal health), as in some countries border inspection personnel is integrated in the sub-national level VS and numbers are difficult to identify.

Table 6.2: Possible revised table for the reporting of veterinary personnel by member countries to the OIE

Countries/ Territories	*PUBLIC - National Prevention System*																				*PUBLIC - Other*						*PRIVATE* (3)							
	Public Veterinary Services central level										**Public Veterinary Services** sub-national level										**Other public vet. professionals** central and sub-national level						**Private veterinary professionals** central and sub-national level							
	Animal health (5) (prevention, surveillance and control)			Public health (abattoirs, processors)			Veterinary diagnostic laboratories (4)			Accred. private veterinarians/parapro-fessionals in public service mission (2)	Animal health (prevention, surveillance and control)			Public health (abattoirs, processors)			Veterinary diagnostic laboratories (4)			Accred. private veterinarians/parapro-fessionals in public service mission (2)	Animal production		Veterinary research, university, training		Other public services		Animal health (livestock)		Animal health (pets)		Public health (abattoirs, processors)		Research and other activities	
	Veterinarians	Other university graduates	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Other university graduates	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Other university graduates	Vet. Paraprofessionals/ technicians (1)		Veterinarians	Other university graduates	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Other university graduates	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Other university graduates	Vet. Paraprofessionals/ technicians (1)		Veterinarians	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Vet. Paraprofessionals/ technicians (1)	Veterinarians	Vet. Paraprofessionals/ technicians (1)
Afghanistan																																		
Albania																																		
Algeria																																		
Andorra																																		
Argentina																																		
Austria																																		
Azerbaijan																																		
Bahrain																																		
Barbados																																		
…																																		

(1) Professional education but no university degree. Includes trained Community Animal Health Workers, livestock inspectors, veterinary technicians, and, in the case of veterinary laboratories, laboratory technicians. Does not include support staff.
(2) Accredited private veterinarians and accredited paraprofessionals undertaking public service missions paid from the public budget (full time and part time).
(3) Private practitioners and veterinarians working in private companies, not incl. accredited private veterinarians undertaking public service missions paid from the public budget.
(4) In countries in which veterinary diagnostic laboratories are fully privatised, this data refers to the main veterinary diagnostic laboratories in a private legal form contracted on a continuous basis by the public Veterinary Services for veterinary diagnostics.
(5) Including border inspection.

6.3.1.3. Animal health situation

Assessments of cost-effectiveness of specific measures targeted at an animal disease such as brucellosis vaccination programmes are often measured against an indicator, such as changes in disease prevalence as identified through active surveillance programmes or changes in the number of reported brucellosis cases per year. At a systemic level a quantitative indicator for the animal health situation in a specific country is, however, not available. In this study, the total number of animal disease outbreaks reported to the OIE was used as a very crude indicator for the overall animal health situation, but this indicator is of very limited use. In comparison, in the public health field a whole set of systemic indicators for the health of the population is available, including the expected lifetime at birth and the Healthy Life Years indicators.[139] In the medium to long term it appears to be indispensable for any economic consideration of animal health measures to have better systemic indicators available that reflect the animal health situation of the livestock population in a given country.

6.3.2. Possibilities to integrate economic indicators into PVS Evaluations

6.3.2.1. OIE-PVS critical competencies and NPS expenditures

The development of the OIE-PVS Tool is the product of a comprehensive and detailed analysis and review of the requirements of effective Veterinary Services, and appears to be a very valuable tool for economic analysis, as it allows comparing input (NPS expenditures) with effects (degree of compliance with OIE International Standards on Quality of Veterinary Services). However, due to the cross-cutting character of several of the critical competencies used for the PVS Tool, it is currently difficult to correlate the costs for key NPS elements (e.g. veterinary diagnostic laboratories) to the results of a sub-set of PVS critical competencies related to this NPS element.[140] It could therefore be considered to refine and group critical competencies to allow a more direct correlation of PVS results and costs for key elements of the NPS (see section 5.2).

6.3.2.2. Define specific economic indicators for OIE-PVS Tool or PVS Gap Analysis

Currently, the OIE-PVS Evaluation is complemented in selected countries by a PVS Gap Analysis. A PVS Gap Analysis is intended as a basis for budgeting to strengthen the Veterinary Services and builds upon the results of the PVS Evaluation. It describes main activities to fill the current gaps identified in the PVS Evaluation and also considers organisational issues related to implementing a so-called ‘5-years conformity strengthening plan’. Having more data available concerning specific expenditures of the National Prevention System would certainly support the process of PVS Gap Analysis and the development of investment programmes based on the results.

Assessment of economic indicators can therefore either be integrated into the OIE-PVS Evaluation, or into the PVS Gap Analysis.

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[139] The Healthy Life Years indicator is also called disability-free life expectancy. It measures the number of remaining years that a person of a certain age is still supposed to live without disability.

[140] During the development of the methodology for this study a significant effort was invested in identifying ways of regrouping and combining the current PVS critical competencies to be able to relate them to relevant cost items or to the costs of key elements of the NPS. However, due to the cross-cutting character of categories used for the PVS Tool this has not been possible.

In both cases we assume that it would not be possible to do a full measurement of NPS expenditures, as this is likely to require a separate visit of a specialist team. Economic indicators would therefore likely concentrate on key elements of the NPS only and would be expressed on a per VLU basis. Possible indicators have been discussed in detail in section 5.1.2 of this study and could include:

- *Indicator for number of NPS personnel relative to requirements:* VLU/Public professional staff of the NPS (including veterinarians, other graduates and veterinary paraprofessionals/technicians);
- *Indicator for relevance of accredited private veterinarians undertaking public service missions:* Public expenditures for accredited private veterinarians/VLU;
- *Indicator for vaccines:* Public expenditures for vaccines/VLU.

To complement the first indicator, the study team could also collect data on expenditures for staff costs (either budget data or calculated from staff numbers and average staff costs levels). During the country studies, it was possible with a relatively limited effort to identify staff costs, as was the case with expenditures for accredited private veterinarians and vaccines. The sum of these three categories of expenditure accounts for more than 60% of total NPS expenditures in all seven case study countries, and provides therefore insight into main cost factors relevant for the NPS.

Another relevant indicator that could be considered is:

- *Indicator for veterinary diagnostic laboratories:* Laboratory expenditures/VLU.

This indicator is more difficult to measure in practice. This is partly related to the general difficulty to obtain relevant budget data, and partly related to the fact that rarely data concerning the depreciation of equipment is available, which is especially relevant for laboratories. However, because of the importance of the laboratory infrastructure, future detailed research could specifically focus on developing benchmark cost data for the laboratory infrastructure.

In addition, other key elements of NPS expenditures could be identified that deserve detailed scrutiny from an economic perspective, including specific programmes and activities, such as active surveillance and eradication programmes.

If data on expenditures concerning these and other indicators cannot be collected during the OIE-PVS Evaluation or the PVS Gap Analysis, the following alternative approaches are possible:

- Collect data through focused study visits of a specialist expert team; or
- Collect data through local correspondents.

If through these activities cost data concerning relevant components of NPS expenditures are collected, unit cost estimates can be derived for the most relevant items. In the medium to long term a database of regional benchmark cost data for key elements of the NPS could be gathered. Relevant experiences from the public health field as described in section 2.4.1 of this report could be worth evaluating in-depth, both in terms of data collection procedures and the use of data.

Regional benchmark cost data for key elements of NPS costs would serve several useful purposes. First, the estimates would provide more precise data on specific cost items that could be used to modify and improve cruder estimates of the total NPS expenditures in individual countries. Second, the results would provide a means of incorporating cost estimates of specific items in support of the corresponding PVS scores. Third, the cost estimates would be of great value in the design and budgeting of desired improvements in the NPS provisions in developing and transition countries, creating both a better basis for the budgeting process of specific countries and more transparency for donors.

This leads to the following conclusion:

13. ***Consideration could be given to the development of a database of benchmark cost data concerning specific components of NPS expenditures.*** The necessary data could be obtained during the PVS Evaluation or PVS Gap Analysis visit or, alternatively, through a visit of a specialist expert team. Benchmark cost data concerning key elements of the NPS would create a better basis for the design and budgeting of desired improvements in the NPS provisions in developing and transition countries, creating both a better basis for the budgeting process of specific countries and more transparency for donors.

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Annex 2: Complete data sets case studies

1. Costa Rica

Table CR - 1: Operating expenditures for 2007 in international dollars [(a)]

<table>
<tr><th></th><th colspan="4">Central level</th><th colspan="2">Sub-national level</th><th colspan="3"></th></tr>
<tr><th></th><th>SENASA - Central Veterinary Units</th><th>SENASA - Veterinary Laboratory (national and sub-national)</th><th>SENASA - Border inspection and quarantine</th><th>Veterinary Statutory body</th><th>SENASA Sub-national operations</th><th>Munici-palities</th><th>Total public expenditures VS [(b)]</th><th>Donor programmes</th><th>Total public expenditures VS (including donor progr.)</th></tr>
<tr><td>Staff costs (including wages, social contributions and non-wage income, i.e. in-kind payments)</td><td>2,772,990</td><td>860,673</td><td>2,016,232</td><td>125,656</td><td>2,424,312</td><td>0</td><td>8,199,864</td><td rowspan="6">411,726</td><td rowspan="6">11,584,157</td></tr>
<tr><td>Material supplies (e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)</td><td>237,132</td><td>617,884</td><td>53,934</td><td rowspan="5">315,839</td><td>157,363</td><td>0</td><td>1,066,314</td></tr>
<tr><td>Services (e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)</td><td>33,900</td><td>2,546</td><td>6,792</td><td>3,668</td><td>0</td><td>46,906</td></tr>
<tr><td>Consumption of fixed capital (reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.) [(c)]</td><td>77,585</td><td>380,560</td><td>59,374</td><td>67,357</td><td></td><td>584,876</td></tr>
<tr><td>Compensation of livestock holders (for animals culled for disease control purposes)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Other current expenditures (e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)</td><td>709,543</td><td>41,138</td><td>118,604</td><td>89,348</td><td>0</td><td>958,632</td></tr>
<tr><td>Total operational expenditure</td><td>3,831,149</td><td>1,902,802</td><td>2,195,563</td><td>441,495</td><td>2,742,048</td><td>0</td><td>11,172,431</td></tr>
</table>

Notes:

(a) Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided. The shares of expenditures related to the NPS are estimated using staff data.

(b) In this column, total public expenditures VS related to material supplies, services, consumption of fixed capital, compensation of livestock holders and other current expenditures do not include the 315,839 international dollars of the Veterinary Statutory Body.

(c) No data on consumption of fixed capital directly available. Consumption of fixed capital calculated on basis of inventory of equipments and buildings, and estimates of useful lives and replacement costs. Buildings are assumed to be fully depreciated. The depreciation of laboratories is assumed to represent 20% of their respective total operating expenditures based on typical values from sample of institutions.

Table CR - 2: Capital expenditures for 2007 in international dollars

	Central level				*Sub-national level*		
	SENASA - Central Veterinary Units	**SENASA - Veterinary Laboratory (national and sub-national)**	**SENASA - Border inspection and quarantine**	**Veterinary Statutory body**	**SENASA Sub-national operations**	**Municipalities**	***Total public expenditures VS***
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*	701,058	529,005	119,628	0	193,421	0	1,543,111
Capital transfers *(e.g. to other government institutions)*							
Total capital expenditures	701,058	529,005	119,628	0	193,421	0	1,543,111

Note: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time. Capital transfers are transactions in cash or in kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred.
Financial data for fiscal year 2007 (1.1.-31.12.2007).

Table CR - 3: Donor-financed programmes in 2007 related to National Prevention System

Programmes	Donors	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/currency)
Quality and safety of agricultural products in Costa Rica	Secretary of Agriculture, Livestock, Rural Development, Fisheries and Food of Mexico (SAGARPA)	2007	6,616 Mexican Pesos	308,347 Costa Rican colón
Risk assessment (*Elaboración de Opciones para los Materiales Especificos de Riesgo*)	ACDI (Canadian Government)	2007-2009	84,800 US$	2,333,304 Costa Rican colón
Course on risk management	ACDI (Canadian Government)	2007	82,600 US$	2,333,304 Costa Rican colón
Protocols for an Equivalence system	ACDI (Canadian Government)	2007	146,800 US$	2,333,304 Costa Rican colón
Vigilance and traceability	ACDI (Canadian Government)	2007	118,800 US$	2,333,304 Costa Rican colón
Cochliomyia hominivorax eradication programme – Epidemiological surveillance	United State Department of Agriculture (USDA)	1996-Not defined	Not defined	111,592,800 Costa Rican colón

Table CR - 4: Number of staff positions National Prevention System by category in 2007

	Central level				*Sub-national level*		
	SENASA - Central Veterinary Units	**SENASA - Veterinary Laboratory (national and sub-national)**	**SENASA - Border inspection and quarantine**	**Veterinary Statutory body**	**SENASA Sub-national operations**	**Municipalities**	*Total*
Veterinarians/ Graduate personnel (non veterinary)	49	9	20	4	37	0	***117*** [(a)]
Veterinary paraprofessional / veterinary technicians	29	14	40	0	31	0	***114***
Support personnel (not included in total)	18	9	14	7	12	0	***60***
Total *(graduate and veterinary staff members)*	***78***	***23***	***60***	***4***	***68***	***0***	***231***

Notes:
(a) Includes approximately 2 graduates personnel.

Table CR - 5: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Average national and sub-national level SENASA	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	643,436	2,185
Graduate personnel (non veterinary)	534,543	1,815
Veterinary paraprofessionals / veterinary technicians	275,952	937
Support personnel	174,518	593

Table CR - 6: Movable equipment of public VS institutions

	Central level and sub-national level		
	SENASA all central and sub-national units (including food safety)	***Total***	***Estimated average age of equipment (in years)***
1. Office equipment			
Computer	256	256	No data, relatively new equipment
Laptop	15	15	see above
Printer	119	119	see above
Photocopier	28	28	see above
Telephone	140	140	see above
Fax		0	
2. Vehicles		0	
4 Wheel-Drive	135	135	see above
Car		0	
Freezer truck		0	
Freezer van		0	
Motorcycle /Moped	3	3	see above
Truck		0	
3. Other equipment (with a purchasing price of 1,000 USD or more)			
Scanner		0	
Estimated average age of moveable equipment			No data, relatively new equipment

Table CR - 7: Buildings of public VS institutions (as of 31.12.2007)

	Central level and sub-national level		
	SENASA all central and sub-national units (including food safety)	***Total***	***Estimated average age of equipment (in years)***
Office building	6	6	no data
Storage building	2	2	no data
Laboratories	6	6	no data
Border inspections posts	11	11	no data
Other buildings (e.g. veterinary hospitals)		0	
Estimated average age of buildings			no data

2. Kyrgyzstan

Table KRG -1: Operating expenditures for 2007 in international dollars [(a)]

	Central level			Sub-national level					
	Central veterinary authority (SVD) [(b)]	**Border inspection**	**Central veterinary laboratory**	**Sub-national veterinary laboratories**	**VS sub-national units (excl. muni-cipalities)**	**Municipalities**	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (including donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	80,656	794,473	190,917	792,120	1,546,410	-	3,404,576	1,474,494	11,517,181
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	20,408	132,506	569,915	166,922	4,305,647		5,195,398		
Services (*e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	0	0	0	0	15,039		15,039		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)*	129,769	25,408	28,490	419,600	109,279		712,546		
Compensation of livestock holders *(for animals culled for disease control purposes)*									
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)*	58,456	65,246	199,880	65,945	325,603		715,129		
Total operational expenditure	289,289	1,017,633	989,202	1,444,587	6,301,978	0	10,042,688		

Notes:
(a) Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided.
(b) 6 staff members of the Central Veterinary Authority are working in the accounting and finance department. Their salaries are excluded from the total of staff costs. The assumption is that the other costs mainly relate to staff members with veterinary functions and are therefore not adjusted.

Table KRG - 2: Capital expenditures for 2007 in international dollars

	Central level			*Sub-national level*			
	Central veterinary authority (SVD)	**Border inspection**	**Central veterinary laboratory**	**Sub-national veterinary laboratories**	**VS sub-national units (excl. municipalities)**	**Municipalities**	***Total public expenditures VS***
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*				22,558			22,558
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*							
Capital transfers *(e.g. to other government institutions)*							
Total reported capital expenditures				22,558			22,558

Note: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time. Capital transfers are transactions in cash or in kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred.
Financial data for fiscal year 2007 (1.1.-31.12.2007).

Table KRG - 3: Donor-financed programmes in 2007 related to National Prevention System

Programmes	Donors	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/currency)
Avian Influenza project:	World Bank	2006 - 2010	2,300 000 US$	244,300 US$
World Bank project – Central laboratory	UNDP/WB	30.05.2006 - 30.06.2010	Unknown	141,631 US$
World Bank project – Regional laboratories	UNDP/WB	30.05.2006 - 30.06.2010	Unknown	88,401 US$
Project to support the SVD in preparation of veterinary strategic plan in 2007	EU funding	Unknown	Unknown	53,000 Euro

Table KRG - 4: Number of staff positions National Prevention System by category in 2007

	Central level			*Sub-national level*			
	Central veterinary authority (SVD) [(a)]	**Border inspection**	**Central veterinary laboratory**	**Sub-national veterinary laboratories** [(a)]	**VS sub-national units (excl. municipalities)**	**Municipalities** [(b)]	***Total***
Veterinarians	25	191	25	160	576	119	***1096***
Graduate personnel (non veterinary)		15	8	30			***53***
Veterinary paraprofessional / veterinary technicians			22	209			***231***
Support personnel (not included in total)			11	63			***74***
***Total** (graduate and veterinary staff members)*	***25***	***206***	***55***	***399***	***576***	***119***	***1380***

Notes:

(a) Additional 14 staff members were employed by the Anti-epizootical Division at central level but paid from the sub-national budget.

(b) This figure includes the veterinary staff of 12 smaller municipalities and the cities of Bishkek and Osh, funded by the central government budget. A visit to the Veterinary Department of the Bishkek municipality indicated that the department is much larger than the 17 veterinarians funded from the central government budget. A total staff number of 143 was given. The figure in the table is therefore likely to underestimate the role of municipalities. The large majority of the municipal veterinarians in Bishkek seem to be involved in market inspections and other tasks related to food control, including inspections of carcasses of animals slaughtered in villages and delivered to the municipal markets. Only 23 veterinarians of the department reported to have functions directly related to vaccination and animal health.

Table KRG - 5: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	4,108	309	2,414	181
Graduate personnel (non veterinary)	2,459	185	2,000	150
Veterinary paraprofessional / veterinary technicians	1,700	128	1,540	116
Support personnel	708	53	667	50

Table KRG - 6: Movable equipment of public VS institutions (as of 31.12.2007)

	Central level			*Sub-national level*			
	Central veterinary authority (SVD)	**Border inspection**	**Central veterinary laboratory** [(a)]	**Sub-national veterinary laboratories** [(b)]	**VS sub-national units (including municipalities)**	***Total***	***Estimated average age of equipment (in years)***
1. Office equipment							
Computer	46	7	2		116	171	4
Laptop	5	2				7	2
Printer	46	6			95	147	4
Photocopier	7				2	9	5
Telephone	31	10	5		154	200	8
Fax	10	4	1		73	88	8
2. Vehicles				-			
4 Wheel-Drive	4		-	8	16	28	5
Car	4	2	2	-	39	47	5
Freezer truck	2		-	-		2	2
Freezer van	1		-	-		1	3
Motorcycle /Moped			-		1	1	13
Truck	2		1	-	52	55	10
3. Other equipment (with a purchasing price of 1,000 USD or more)							
Scanner							
Estimated average age of moveable equipment							6

Notes:

(a) Only materials purchased in 2007 - No detailed data available.
(b) Only materials purchased in 2007 - Full list of equipment is not available.

Table KRG - 7: Buildings of public VS institutions

	Central level			*Sub-national level*				
	Central veterinary authority (SVD)	**Border inspection**	**Central veterinary laboratory**	**Sub-national veterinary laboratories**	**VS sub-national units (excl. municipalities)**	**Municipalities**	***Total***	***Estimated average age of equipment (in years)***
Office building	1		1		49		51	32
Storage building	1		3				4	
Laboratories			3	34	12		49	11
Border inspections posts							0	
Other buildings (e.g. veterinary hospitals)					3		3	38
Estimated average age of buildings								27

3. Mongolia

Table MON -1: Operating expenditures for 2007 in international dollars

	Central level					*Sub-national level*					
	State Veterinary Department	**SSIA (meat inspection)**	**SSIA (border inspection)**	**NEMA**	**Central Veterinary Laboratory**	***Aimag* veterinary departments (excluding UB)** [(b)]	**Veterinary departments of the Municipality of UB**	**SSIA *Aimag* and *Soum* inspection departments** [(b)]	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (incl. donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	55,729	103,280	582,408	23,296	184,390	1,420,778	109,873	1,528,238	4,007,993	616,509	21,702,267
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	8,470,768	7,358	40,214	1,331	158,905	1,709,188	404,102	141,875	10,933,740		
Services *(e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	1,627,920	n.a.	0	n.a.	0	2,817,219	246,307	n.a.	4,691,445		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)*	12,349	7,985	45,634	1,261	137,616	379,683	7,973	0	592,500		
Compensation of livestock holders *(for animals culled for disease control purposes)*	141,275	0	0	0	0	0	0	0	141,275		
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities)*. [(c)]	105,164	11,778	266,468	1,331	26,080	164,398	35,492	108,095	718,804		
Total operational expenditure	10,413,205	130,401	934,723	27,220	506,991	6,111,582	803,746	1,778,208	21,085,759		

Notes:
(a) No budget data available for sub-national institutions, expect for veterinary departments of the Municipality of Ulaanbaatar. Expenditures for *Aimag* veterinary departments and SSIA *Aimag* and *Soum* inspection departments are based on budget data collected by the evaluation team during the field visit and extrapolated on basis of staff data.
(b) No budget data on consumption of fixed capital directly available, except for the Central Veterinary Laboratory. This is calculated on basis of inventory of equipments and buildings, and estimates of useful lifes and replacement costs.

Table MON - 2: Capital expenditures for 2007 in international dollars

	Central level				*Sub-national level*			
	State Veterinary Department	**SSIA (meat inspection)**	**SSIA (border inspection)**	**Central veterinary laboratory**	***Aimag* veterinary departments (excluding UB)**	**Veterinary departments of the Municipality of UB**	**SSIA *Aimag* and *Soum* inspection departments (including 24 in UB)**	***Total public expenditures VS***
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*		n.a [(a)]	No data available	All equipment was bought from donor support programmes		(b)	0	
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*	13,536	No data - Bought some computers in 2007	No data available		0	No specific equipment at Aimag/soum level, no cars	43,154	56,690
Capital transfers *(e.g. to other government institutions)*		n.a.	No data available				0	
Total reported capital expenditures	13,536						43,154	56,690

Note: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time. Capital transfers are transactions in cash or in kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds, realised by the disposal of another asset, are transferred. Financial data for fiscal year 2007 (1.1.-31.12.2007).

(a) Not significant, just use of the one SSIA building.

(b) Part of the administration.

Table MON - 3: Donor-financed programmes in 2007 related to National Prevention System

Programmes	Donors	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/currency)
Capacity building of *Aimag* veterinary services (Sukhbaatar, Dornogobi and Gobisumber)	EU	2006-2007	300,000 US$	150,000 US$
Various donor programmes for supporting the State Central Veterinary Laboratory	KOICA (Korean International Cooperation Agency), GTZ (Gesellschaft für Technische Zusammenarbeit Germany), Korean National Veterinary Laboratory, International foundation for science	-	-	157,948,215 Tugrug

Table MON - 4: Number of staff positions National Prevention System by category in 2007

	Central level				*Sub-national level*			
	State Veterinary Department	**SSIA (meat inspection)**	**SSIA (border inspection)**	**Central veterinary laboratory**	***Aimag* veterinary departments (excluding UB)**	**Veterinary departments of the Municipality of UB**	**SSIA *Aimag* and *Soum* inspection departments (including 24 in UB)**	***Total***
Veterinarians	8	19	75	28	152	152	16	***450***
Graduate personnel (non veterinary)				8		196	3	***207***
Veterinary paraprofessional / veterinary technicians					3		1	***4***
Support personnel (not included in total)				15	58		8	***81***
Total *(graduate and veterinary staff members)*	***8***	***19***	***75***	***36***	***155***	***348***	***20***	***661***

Table MON - 5: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	337,992	625	222,901	412
Graduate personnel (non veterinary)			285,000	527
Veterinary paraprofessional / veterinary technicians			235,000	434
Support personnel			157,000	290

Table MON - 6: Movable equipment of public VS institutions

	Central level					*Sub-national level*				
	State Veterinary Department	**SSIA (meat inspection)**	**SSIA (border inspection)**	**NEMA**	**Central veterinary laboratory**	***Aimag* veterinary departments (excluding UB)**	**Veterinary departments of the Municipality of UB**	**SSIA *Aimag* and *Soum* inspection departments (including 24 in UB)**	***Total***	***Estimated average age of equipment (in years)***
1. Office equipment										
Computer	9	19	8	3	22	112	9		182	10
Laptop	7	2	0	0	1	8	2		20	5
Printer	8	7	4	1	20	74	9		123	11
Photocopier	1	0	0	0	6	8	2		17	10
Telephone	3	7	21	1	10	19	5		66	16
Fax	1	1	10	0	2	8	2		24	17
2. Vehicles				0		0			0	
4 Wheel-Drive	0	0	16		5	128	3	No specific equipment	152	15
Car	2	No cars	0		1	8	2		13	9
Freezer truck	0	0	0			0			0	
Freezer van	0	0	0			0			0	
Motorcycle /Moped	0	0	0			0			0	
Truck	0	0	0			0			0	
3. Other equipment (with a purchasing price of 1,000 USD or more)				0		0			0	
Digital camera		1	10	0		0			11	2
Estimated average age of moveable equipment										10

Table MON - 7: Buildings of public VS institutions

	Central level				*Sub-national level*				
	State Veterinary Department	**SSIA (meat inspection)**	**SSIA (border inspection)**	**Central veterinary laboratory**	***Aimag* veterinary departments (excluding UB)**	**SSIA *Aimag* and *Soum* inspection departments (including 24 in UB)**	**Veterinary departments of the Municipality of UB**	***Total***	***Estimated average age of equipment (in years)***
Office building		1	23	2	1		1	28	33
Storage building			4				1	5	5
Laboratories			2				2	4	
Border inspections posts			37					37	
Other buildings (e.g. veterinary hospitals)								0	
Estimated average age of buildings									19

4. Morocco

Table MOR - 1: Operating expenditures for 2007 in international dollars

<table>
<tr><th></th><th colspan="3">Central level</th><th colspan="3">Sub national level</th><th colspan="3"></th></tr>
<tr><th></th><th>Animal Health Division</th><th>National Laboratory for Epidemiology and Zoonoses (LNEZ)</th><th>Border Inspection Posts[(a)]</th><th>VS of the Provincial Directions of Agriculture (DPA)</th><th>VS of the Regional Offices for Agriculture (ORMVA)</th><th>Regional Laboratories (LRARV)</th><th>Total public expenditures VS</th><th>Donor programmes</th><th>Total public expenditures VS (incl. donor progr.)</th></tr>
<tr><td>Staff costs (including wages, social contributions and non-wage income, i.e. in-kind payments) [(b)]</td><td>717,327</td><td>395,121</td><td>706,931</td><td>13,048,762</td><td>3,950,495</td><td>3,477,475</td><td>22,296,112</td><td rowspan="7">1,887,152</td><td rowspan="7">48,698,199</td></tr>
<tr><td>Material supplies (e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles) [(c)]</td><td>9,870,050</td><td>10,726</td><td>16,187</td><td>500,206</td><td>520,178</td><td>1,713,903</td><td>12,631,249</td></tr>
<tr><td>Services (e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)</td><td>-</td><td>-</td><td>0</td><td>3,763,614</td><td>2,424,505</td><td>-</td><td>6,188,119</td></tr>
<tr><td>Consumption of fixed capital (reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.) [(d)]</td><td>13,269</td><td>15,507</td><td>23,402</td><td>239,766</td><td>244,130</td><td>1,382,261</td><td>1,918,335</td></tr>
<tr><td>Compensation of livestock holders (for animals culled for disease control purposes)</td><td>-</td><td>-</td><td>0</td><td>527,021</td><td>958,127</td><td>-</td><td>1,485,149</td></tr>
<tr><td>Other current expenditures (e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.) [(e)]</td><td>26,249</td><td>35,747</td><td>53,945</td><td>1,417,168</td><td>421,308</td><td>337,668</td><td>2,292,085</td></tr>
<tr><td>Total operational expenditure</td><td>10,626,894</td><td>457,102</td><td>800,464</td><td>19,496,538</td><td>8,518,742</td><td>6,911,307</td><td>46,811,047</td></tr>
</table>

Notes:
(a) No budget data directly available. Staff costs are calculated on basis of staff numbers and average staff costs per staff category. Other items are calculated on basis of expenditures per graduate and veterinary staff member of the *LNEZ*. Border inspections performed by veterinarians of the VS of the *DPA* could not be separately identified; and are not included here.
(b) No budget data on staff costs available. This is calculated on basis of staff numbers and average staff costs per staff category.
(c) No budget data directly available for the expenditures related to material supplies for the VS of the *ORMVA*. This figure is calculated on basis of extrapolation of data collected for *ORMVA* - Tadla.
(d) No budget data on consumption of fixed capital directly available. This is calculated on basis of inventory of equipments and buildings, and estimates of useful life and replacement costs, except for laboratories for which the depreciation is assumed to represent 20% of their respective total operating expenditures based on typical values from sample of institutions.
(e) For the central level, assumptions on the expenditures related to utilities are used. Other current expenditures for the VS of the *ORMVA* and the *DPA* are extrapolated using the data collected for *ORMVA*-Tadla, *DPA* in Laayone and in Tanger and staff data.

Table MOR - 2: Capital expenditures for 2007 in international dollars

	Central level			*Sub-national level*			
	Animal Health Division	**National Laboratory for Epidemiology and Zoonoses (LNEZ)**	**Border Inspection Posts**	**VS of the Provincial Directions of Agriculture (DPA)**	**VS of the Regional Offices for Agricultural Development (ORMVA)**	**Regional Laboratories for Analyses and Veterinary Research (LRARV)**	***Total public expenditures VS***
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*				43,618			43,618
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*	217	2,269		29,939		6,807	39,231
Capital transfers *(e.g. to other government institutions)*							
Total capital expenditures	217	2,269		73,557		6,807	82,849

Note: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time. Capital transfers are transactions in cash or in kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred. Financial data for fiscal year 2007 (1.1.-31.12.2007).

Table MOR -3: Donor-financed programmes in 2007 related to National Prevention System

Programmes	Donors	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/currency)
Strengthening of monitoring and warning systems for the Bluetongue, West Nile Fever and rabies in Morocco, Algeria and Tunisia.[a]	FAO	24 months (start: January 2007)	250,000 US$	41,667 US$
Cooperation programme for the monitoring of the Bluetongue	Spanish Agency of international cooperation for development	2007	120,000 Euro	176,742 US$
Twinning project between Morocco and the European Union for the strengthening of the structures for veterinary sanitary control and phytosanitary control. [b]	European Union	30 months (April 2007 to September 2009)	2,160,000 Euro	954,407 US$

Notes:

(a) Programme of 24 months. The share of the total budget (250,000 USD) allocated to Morocco could not be obtained. It is assumed that the budget is equally distributed over the two years of the programme and over the three countries.

(b) It is assumed that the total budget is equally distributed over the 30 months of the programme.

Table MOR - 4: Number of staff positions National Prevention System by category in 2007

	Central level			*Sub-national level*			
	Animal Health Division	**National Laboratory for Epidemiology and Zoonoses (LNEZ)**	**Border Inspection Posts**	**VS of the Provincial Directions of Agriculture (DPA)**	**VS of the Regional Offices for Agricultural Development (ORMVA)**	**Regional Laboratories for Analyses and Veterinary Research (LRARV)**	***Total***
Veterinarians	15	3	15	147	29	31	***240***
Graduate personnel (non veterinary)	1	5	2	0	0	20	***28***
Veterinary paraprofessional / veterinary technicians	2	3	0	453	162	19	***639***
Support personnel (not included in total)	4	7	3	123	18	32	***187***
Total *(graduate and veterinary staff members)*	***18***	***11***	***17***	***600***	***191***	***70***	***907***

Table MOR - 5: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central and sub-national levels	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	16,800	3,465
Graduate personnel (non veterinary)	14,000	2,888
Veterinary paraprofessional / veterinary technicians	4,900	1,011
Support personnel	3,500	722

Note:
(a) The distinction between national and sub-national levels for the Staff costs was reported not to be relevant for Morocco.

Table MOR - 6: Movable equipment of public VS institutions

	Central level			*Sub-national level*				
	Animal Health Division	**National Laboratory for Epidemiology and Zoonoses (LNEZ)**	**Border Inspection Posts**	**VS of the Provincial Directions of Agriculture (DPA)**	**VS of the Regional Offices for Agricultural Development (ORMVA)**	**Regional Laboratories for Analyses and Veterinary Research (LRARV)**	***Total***	***Estimated average age of equipment (in years)***
1. Office equipment								
Computer	11	10	15	128	29	149	342	5
Laptop	1	1	2	0	0	44	47	4
Printer	10	9	14	93	19	123	267	4
Photocopier	12	1	2	8	0	9	31	5
Telephone	3	12	18	24	10	18	85	6
Fax	0	1	2	11	0	18	31	6
2. Vehicles			0	0	0	0	0	
4 Wheel-Drive	0	0	0	15	0	9	24	16
Car	2	3	5	77	38	53	177	10
Freezer truck	0		0	0	0	0	0	
Freezer van	0		0	0	0	0	0	
Motorcycle /Moped	1	1	2	0	0	0	3	
Truck	0		0	0	0	0	0	
3. Other equipment (with a purchasing price of 1,000 USD or more)			0	0			0	
Digital camera	6	2	3				11	6
Estimated average age of moveable equipment								7

Table MOR - 7: Buildings of public VS institutions

	Central level				*Sub-national level*			
	Animal Health Division	**National Laboratory for Epidemiology and Zoonoses (LNEZ)**	**Border Inspection Posts**	**VS of the Provincial Directions of Agriculture (DPA)**	**VS of the Regional Offices for Agricultural Development (ORMVA)**	**Regional Laboratories for Analyses and Veterinary Research (LRARV)**	***Total***	***Estimated average age of equipment (in years)***
Office building	1	1	3	62 [(a)]	9	6	82	23
Storage building	3	1		17	9	6	36	26
Laboratories						6	6	20
Border inspections posts							0	
Other buildings (e.g. veterinary hospitals)				38			38	
Estimated average age of buildings								23

Note:
(a) Office buildings for the Veterinary Services of the Provincial Directions of Agriculture include the sub-veterinary inspections.

5. Turkey

Table TR - 1: Operating expenditures for 2007 in international dollars [(a)]

	Central level			*Sub-national level*					
	General Directorate for Protection and Control (KKGM)	**FMD Institute** (Sap Enstitüsü) [(a)]	**Border inspection**	**Sub-national units of Ministry (MARA)[(c)]**	**Municipa -lities**	**Regional laboratories [(a)]**	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (incl. donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	1,154,649	3,124,845	1,606,890	94,934,681	6,181,548	16,480,519	123,483,132	13,118,036	180,080,415
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	63,367	9,236	87,294	2,281,500	148,557	552,522	3,142,476		
Services *(e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	4,987,449	3,747	8,767	524,859	34,175	78,133	5,637,130		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)*	1,381,673	791,674	90,952	5,246,468	341,617	4,357,962	12,210,346		
Compensation of livestock holders *(for animals culled for disease control purposes)*	13,161,826	0	0	0	0	0	13,161,826		
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)*	6,884,499	28,868	25,144	1,941,843	126,441	320,675	9,327,469		
Total operational expenditure	27,633,463	3,958,370	1,819,047	104,929,350	6,832,338	21,789,811	166,962,379		

Notes:
(a) Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided. Revolving capital budget not included (i.e. income from economic activities). This is assumed to compensate costs for provision of services to third parties, and therefore only the government budget component has been included.
(b) No budget data on consumption of fixed capital directly available. The depreciation of laboratories is assumed to represent 20% of their total operating expenditures. The depreciation for other institutions is assumed to represent 5% of their respective total operating expenditures based on typical values from sample of institutions.
(c) Extrapolated from budget data on basis of NPS relevant number of staff to total number of provincial staff (veterinarians and veterinary technicians).

Table TR - 2: Capital expenditures for 2007 in international dollars

	Central level			*Sub-national level*			
	General Directorate for Protection and Control (KKGM)	**FMD Institute (Sap enstitüsü)**	**Border inspection**	**Sub national units of the Ministry of Agriculture and Rural Affairs**	**Municipalities**	**Regional laboratories**	***Total public expenditures VS***
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*	18,947,539	26,282	20,316	753,341	no data	1,636,513	25,862,581
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*		46,072	27,665	1,397,389	no data	3,007,464	
Capital transfers *(e.g. to other government institutions)*							
Total reported capital expenditures	18,947,539	72,354	47,981	2,150,730		4,643,977	25,862,581

Note: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time. Capital transfers are transactions in cash or in kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred. Financial data for fiscal year 2007 (1.1.-31.12.2007).

Table TR - 3: Donor-financed programmes in 2007 related to National Prevention System

Programmes	Donors	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/currency)
EU projects	EU	-	-	7,279,398 Euro
USAID project	USAID	2007 -2008	975,000 US$	15,000 US$

Table TR - 4: Number of staff positions National Prevention System by category in 2007

	Central level			*Sub-national level*			
	General Directorate for Protection and Control (KKGM)	**FMD Institute (Sap enstitüsü)**	**Border inspection**	**Sub national units of the Ministry of Agriculture and Rural Affairs**	**Municipalities**	**Regional laboratories**	***Total***
Veterinarians	48	24	19	1953	141	163	***2348***
Graduate personnel (non veterinary)	2	n.a.		n.a.		n.a.	***2***
Veterinary paraprofessional / veterinary technicians	0	3	4	1733	n.a.	11	***1751***
Support personnel (not included in total)	n.a.			n.a.			***n.a.***
Total *(graduate and veterinary staff members)*	***50***	***27***	***23***	***3686***	***141***	***174***	***4101***

6. Uganda

Table UG - 1: Operating expenditures for 2007 in international dollars [(a)]

	Central level					*Sub-national level*				
	Central veterinary service (DLHE)	**Central Veterinary Laboratory [(a)] (CVL)**	**COCTU [(b)]**	**Uganda Wildlife Authority [(c)]**	**National Drug Authority**	**District Veterinary Services [(d)]**	**Munici-palities**	***Total public expenditures VS***	***Donor programmes***	***Total public expenditures VS (including donor progr.)***
Staff costs *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	1,441,883	No separate budget data available	114,311	61,173	40,782	3,513,434	0	5,171,582	6,481,169	23,369,295
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	10,079,803	0	28,898	72,244	48,163	265,616	0	10,494,724		
Services *(e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)*	685,987	0	7,058	17,645	11,764	0	0	722,454		
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.) [(e)]*	44,831	0	8,703	10,510	7,007	16,514	0	87,565		
Compensation of livestock holders *(for animals culled for disease control purposes)*	0	0	0	0	0	0	0	0		
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)*	80,691	0	38,639	45,285	87,728	159,457	0	411,801		
Total operational expenditure	12,333,196	0	197,609	206,858	195,443	3,955,021	0	16,888,126		

Notes:

(a) CVL is integrated into the DLHE and partly financed from the DLHE budget, partly from donor funds.
(b) It is estimated that only 40% of total costs are considered as relating to animal health (60% human health).
(c) No budget data directly available for Uganda Wildlife Authority. Expenditures are extrapolated on basis of staff numbers and budget data of other institutions at central level.
(d) No budget data directly available for all District Veterinary Services. Expenditures are extrapolated on basis of staff data and data collected for the districts of Mukuno, Igunga and Kampala.
No budget data on consumption of fixed capital directly available. Consumption of fixed capital calculated on basis of inventory of equipments and buildings. The Central Veterinary Laboratory is assumed to be fully depreciated.

Table UG - 2: Capital expenditures for 2007 in international dollars

	Central level					*Sub-national level*	
	Central veterinary service (Department of Livestock Health and Entymology - DLHE)	**Central veterinary laboratory**	**Coordinating Office for the Control of Trypanosmosiasis in Uganda (COCTU)**	**Uganda Wildlife Authority (only veterinary functions considered)**	**National Drug Authority (only registration of veterinary drugs)**	**District Veterinary Services (district departments of production of the MAIF)**	***Total public expenditures VS***
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*							
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*	53,300						53,300
Capital transfers *(e.g. to other government institutions)*							
Total reported capital expenditures							

Note: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time. Capital transfers are transactions in cash or in kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred. Financial data for fiscal year 2007 (1.1.-31.12.2007).

Table UG - 3: Donor-financed programmes in 2007 related to National Prevention System

Programmes	Donors	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/currency)
Pan African Control of Epizootis (PACE)	EU	2000 to 2008	3,268,026,782 USX	746,540 US$
Farming in tsetse infested areas (FITCA)	EU		3,358,651,000 USX	407,721 US$
National Livestock Productivity Improvement Project	African Development Bank		5,396,540,290 USX	759,154 US$
FAO, DANIDA Communication programmes on HPAI	DANIDA/FAO/Poultry association of Uganda		Approx. 50,000 US$ for communication (plus 50,000 US$ for protective equipment for the department)	100,000 US$
HPAI Emergency response plan, Active surveillance programme, second phase started in 2008	USAID through FAO	August 2006 to March 2008 (second phase April 2008 to March 2009)	375,000 USD for first phase (for second phase 417,000 US$)	225,000 US$
Communication component concerning HPAI	USAID/UPHOLD	Financial year 2007 (duration approx. 6 month)	115,000 US$ (estimate)	115,000 US$
HPAI regional programme eastern and southern Africa	FAO	Until September 2007 (Inception workshop Feb 2006)	400,000 US$ for 12 countries	16,000 US$ (estimate)
ADF loan account - Tse tse and Trypanosomiasis free areas project (reported from COCTU)	ADB		Initial disbursement: 421,487 US$	19,360 US$ [a]

Note:

(a) Programme contains human and animal health components which are difficult to separate, animal health component is estimated at 50%.

Table UG - 4: Number of staff positions National Prevention System by category in 2007

	Central level					*Sub-national level*	
	Central veterinary service (Department of Livestock Health and Entymology - DLHE)	**Central veterinary laboratory**	**Coordinating Office for the Control of Trypanosmosiasis in Uganda (COCTU)**	**Uganda Wildlife Authority (only veterinary functions considered)**	**National Drug Authority (only registration of veterinary drugs)**	**District Veterinary Services (district departments of production of the MAIF)**	*Total*
Veterinarians	18	CVL is integrated into the DLHE	0	3	2	322	***345***
Graduate personnel (non veterinary)	9		1		0	*67*	***77***
Veterinary paraprofessional / veterinary technicians	3		0		0	*211*	***214***
Support personnel (not included in total)	23		3		0		***26***
***Total** (graduate and veterinary staff members)*	***30***	***0***	***1***	***3***	***2***	***600***	***636***

Table UG - 5: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	1,065,321	1,699	n.a.	
Graduate personnel (non veterinary)	970,791	1,548	n.a.	
Veterinary paraprofessional / veterinary technicians	534,515	853	n.a.	
Support personnel	433,510	691	n.a.	

Table UG - 6: Movable equipment of public VS institutions

	Central level					*Sub-national level*		
	Central veterinary service (Department of Livestock Health and Entymology - DLHE)	**Central veterinary laboratory**	**Coordinating Office for the Control of Trypanosmosiasis in Uganda (COCTU)**	**Uganda Wildlife Authority (only veterinary functions considered)**	**National Drug Authority (only registration of veterinary drugs)**	**District Veterinary Services (district departments of production of the MAIF)**	***Total***	***Estimated average age of equipment (in years)***
1. Office equipment								
Computer	27		6	3		39	78	4
Laptop	9		1	1		0	11	5
Printer	27		6	3		39	78	4
Photocopier	6		1	1		0	8	4
Telephone	14		3	1		0	18	6
Fax	3			0		0	3	4
2. Vehicles				0		0	0	
4 Wheel-Drive	10		2			0	12	5
Car				3		0	3	
Freezer truck				0		0	0	
Freezer van				0		0	0	
Motorcycle /Moped	7		1			199	224	5
Truck	1						1	14
3. Other equipment (with a purchasing price of 1,000 USD or more)								
Digital camera								
Estimated average age of moveable equipment								6

Table UG - 7: Buildings of public VS institutions

	Central level					*Sub-national level*		
	Central veterinary service (Department of Livestock Health and Entymology - DLHE)	**Central veterinary laboratory**	**Coordinating Office for the Control of Trypanosmosiasis in Uganda (COCTU)**	**Uganda Wildlife Authority (only veterinary functions considered)**	**National Drug Authority (only registration of veterinary drugs)**	**District Veterinary Services (district departments of production of the MAIF)**	***Total***	***Estimated average age of equipment (in years)***
Office building			2					
Storage building								
Laboratories								
Border inspections posts								
Other buildings (e.g. veterinary hospitals)								
Estimated average age of buildings								n.a.

7. Vietnam

Table VN - 1: Operating expenditures for 2007 in international dollars

<table>
<tr><th></th><th colspan="4">Central level</th><th colspan="4">Sub-national level</th><th colspan="3"></th></tr>
<tr><th></th><th>Department of Animal Health, MARD</th><th>National Centre for Veterinary Diagnostics</th><th>National centres for hygiene and inspections</th><th>Veterinary Inspection Posts</th><th>Provincial Veterinary Departments [b]</th><th>District Veterinary Stations (DVS) [b]</th><th>Communal Veterinary Teams [b]</th><th>Regional Animal Health Laboratories</th><th>Total public expenditures VS</th><th>Donor programmes</th><th>Total public expenditures VS (incl. donor progr.)</th></tr>
<tr><td>Staff costs (including wages, social contributions and non-wage income, i.e. in-kind payments)</td><td>209,019</td><td>98,385</td><td>99,053</td><td>167,911</td><td colspan="3">28,514,080</td><td>573,655</td><td>29,662,103</td><td rowspan="7">5,263,218</td><td rowspan="7">72,618,991</td></tr>
<tr><td>Material supplies (e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)</td><td>15,335,317</td><td>308,094</td><td>245,230</td><td>298,018</td><td colspan="3">6,818,366</td><td>1,115,522</td><td>24,120,547</td></tr>
<tr><td>Services (e.g. fees for accredited private veterinarians who undertake public services mission, and if subcontracted, laboratory diagnostics, communications, training of employees)</td><td>183,954</td><td>0</td><td>0</td><td>0</td><td colspan="3">2,127,966</td><td>0</td><td>2,311,920</td></tr>
<tr><td>Consumption of fixed capital [c] (reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings etc.)</td><td>308,932</td><td>229,375</td><td>257,030</td><td>85,217</td><td colspan="3">8,073,387</td><td>229,375</td><td>9,183,316</td></tr>
<tr><td>Compensation of livestock holders (for animals culled for disease control purposes)</td><td>0</td><td>0</td><td>0</td><td>0</td><td colspan="3">0</td><td>0</td><td>0</td></tr>
<tr><td>Other current expenditures (e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)</td><td>26,357</td><td>4,787</td><td>14,082</td><td>11,207</td><td colspan="3">1,961,901</td><td>59,554</td><td>2,077,888</td></tr>
<tr><td>Total operational expenditure</td><td>16,063,579</td><td>640,641</td><td>615,394</td><td>562,353</td><td colspan="3">47,495,699</td><td>1,978,107</td><td>67,355,773</td></tr>
</table>

Notes:
(a) No budget data directly available for all sub national institutions, except for Regional Animal Health Laboratories. Expenditures are extrapolated on basis of staff data and data collected for the provinces of Hanoi and Hanam.
(b) No budget data on consumption of fixed capital directly available for the Department of Animal Health, Ministry of Agriculture and Rural Development. Consumption of fixed capital is calculated on basis of inventory of equipments and buildings and estimates of useful lives and replacement costs.

Table VN - 2: Capital expenditures for 2007 in international dollars

	Central level				*Sub-national level*				
	Department of Animal Health	**National Centre (laboratory) for Veterinary Diagnostics**	**National centres (laboratories) for hygiene and inspections**	**Veterinary Inspection Posts**	**Provincial Veterinary Departments**	**District Veterinary Stations (DVS)**	**Communal Veterinary Teams**	**Regional Animal Health Laboratories**	***Total public expenditures VS***
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*									No data available
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*									
Capital transfers *(e.g. to other government institutions)*									
Total reported capital expenditures									

Note: A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time. Capital transfers are transactions in cash or in kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred. Financial data for fiscal year 2007 (1.1.-31.12.2007).

Table VN - 3: Donor-financed programmes in 2007 related to National Prevention System

Programmes	Donors	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/currency)
Various donor programmes to support control of Avian Influenza and related measures	FAO	2006 – 2007	252,569 US$	252,569 US$
	FAO	2006 – 2008	1,747,500 US$	396,237 US$
	FAO	2007	220,250 US$	220,250 US$
	FAO-Swiss	2007	20,593 US$	20,593 US$
	USDA	2007	23,420 US$	23,420 US$
	USDA	2007	15,444 US$	15,444 US$
	Netherlands	2006 – 2007	150,000 US$	149,164 US$
	Singapore	2007	96,000 US$	96,000 US$
	Reading University, London	2007	11,097 US$	11,097 US$
	World Bank	2007	147,997 US$	147,997 US$
	UNICEF	2007	8,608 US$	8,608 US$
Other donor support programmes (e.g. related to slaughter, support to labs and creation of areas free of Food and Mouth and Pig Cholera disease)	UDSA	2007	3,318 US$	3,318 US$
	OIE	2007 – 2008	815,000 US$	234,312 US$
	New Zealand	2007 – 2008	100,000 US$	90,000 US$

Table VN - 4: Number of staff positions National Prevention System by category in 2007

	Central level				*Sub-national level*				
	Department of Animal Health	**National Centre (laboratory) for Veterinary Diagnostics**	**National centres (laboratories) for hygiene and inspections**	**Veterinary Inspection Posts**	**Provincial Veterinary Departments**	**District Veterinary Stations (DVS)**	**Communal Veterinary Teams**	**Regional Animal Health Laboratories**	***Total***
Veterinarians	43	21	18	35	4,050			105	***4,272***
Graduate personnel (non veterinary)	6	1	7	2	48			9	***73***
Veterinary paraprofessional / veterinary technicians	2	1	0	8	11,622			13	***11,646***
Support personnel (not included in total)	6	1	2	2	87			18	***116***
Total *(graduate and veterinary staff members)*	***51***	***23***	***25***	***45***	***15,720***			***127***	***15,991***

Table VN - 5: Average staff costs by category in 2007 (average of all VS institutions, including wages, social contributions and non-wage income)

	Central level		*Sub-national level*	
	Monthly staff costs per staff member (in national currency)	**Monthly staff costs per staff member (in international Dollars)**	**Monthly staff costs per staff member (in national currency)**	**Monthly staff costs per staff member (in international Dollars)**
Veterinarians	1,504,667	291	1,700,000	329
Graduate personnel (non veterinary)	1,550,000	300	1,700,000	329
Veterinary paraprofessional / veterinary technicians	1,250,000	242	2,430,000	471
Support personnel	1,433,333	278	2,176,000	422

Table VN - 6: Movable equipment of public VS institutions

<table>
<tr><th></th><th colspan="4">Central level</th><th colspan="4">Sub-national level</th><th colspan="2"></th></tr>
<tr><th></th><th>Department of Animal Health</th><th>National Centre (laboratory) for Veterinary Diagnostics</th><th>National centres (laboratories) for hygiene and inspections</th><th>Veterinary Inspection Posts</th><th>Provincial Veterinary Departments</th><th>District Veterinary Stations (DVS)</th><th>Communal Veterinary Teams</th><th>Regional Animal Health Laboratories</th><th>Total</th><th>Estimated average age of equipment (in years)</th></tr>
<tr><td>1. Office equipment</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td></td><td></td><td></td></tr>
<tr><td>Computer</td><td>27</td><td>24</td><td>18</td><td>0</td><td colspan="3">437</td><td>83</td><td>588</td><td>4</td></tr>
<tr><td>Laptop</td><td>5</td><td>1</td><td>1</td><td>0</td><td colspan="3">120</td><td>13</td><td>140</td><td>3</td></tr>
<tr><td>Printer</td><td>27</td><td>11</td><td>15</td><td>0</td><td colspan="3">336</td><td>83</td><td>472</td><td>4</td></tr>
<tr><td>Photocopier</td><td>4</td><td>3</td><td>1</td><td>4</td><td colspan="3">39</td><td>13</td><td>64</td><td>3</td></tr>
<tr><td>Telephone</td><td>15</td><td>12</td><td>0</td><td>0</td><td colspan="3">476</td><td>83</td><td>585</td><td>7</td></tr>
<tr><td>Fax</td><td>4</td><td>1</td><td>0</td><td>0</td><td colspan="3">567</td><td>6</td><td>578</td><td>5</td></tr>
<tr><td>2. Vehicles</td><td>0</td><td>0</td><td>0</td><td>0</td><td colspan="3">0</td><td>0</td><td>0</td><td></td></tr>
<tr><td>4 Wheel-Drive</td><td>5</td><td>0</td><td>0</td><td>8</td><td colspan="3">48</td><td>6</td><td>67</td><td>10</td></tr>
<tr><td>Car</td><td>0</td><td>2</td><td></td><td>0</td><td colspan="3"></td><td>0</td><td>2</td><td></td></tr>
<tr><td>Freezer truck</td><td>0</td><td>0</td><td></td><td>0</td><td colspan="3"></td><td>0</td><td>0</td><td></td></tr>
<tr><td>Freezer van</td><td>0</td><td>0</td><td></td><td>0</td><td colspan="3"></td><td>0</td><td>0</td><td></td></tr>
<tr><td>Motorcycle /Moped</td><td>0</td><td>0</td><td></td><td></td><td colspan="3"></td><td>0</td><td>0</td><td>14</td></tr>
<tr><td>Truck</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td></td><td></td><td></td></tr>
<tr><td>3. Other equipment (with a purchasing price of 1,000 USD or more)</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td></td><td></td><td></td></tr>
<tr><td>Digital camera</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td></td><td></td><td></td></tr>
<tr><td colspan="10">Estimated average age of moveable equipment</td><td>6</td></tr>
</table>

Table VN - 7: Buildings of public VS institutions

	Central level				*Sub-national level*					
	Department of Animal Health	**National Centre (laboratory) for Veterinary Diagnostics**	**National centres (laboratories) for hygiene and inspections**	**Veterinary Inspection Posts**	**Provincial Veterinary Departments**	**District Veterinary Stations (DVS)**	**Communal Veterinary Teams**	**Regional Animal Health Laboratories**	***Total***	***Estimated average age of equipment (in years)***
Office building	2	1	2	4	722			7	738	20
Storage building	1	1			307				309	
Laboratories		1			10			7	18	22
Border inspections posts					78				78	
Other buildings (e.g. veterinary hospitals)										
Estimated average age of buildings										21

Annex 3: Data collection questionnaire for case studies

CIVIC
CONSULTING

OIE STUDY ON COSTS OF NATIONAL PREVENTION SYSTEMS FOR ANIMAL DISEASES AND ZOONOSES

###COUNTRY### - CENTRAL VETERINARY AUTHORITY

SURVEY OF PUBLIC VETERINARY SERVICES (NATIONAL LEVEL): *###DEPARTMENT###*

Please return this questionnaire by email in Word-Format to *dore@civic-consulting.de*

Civic Consulting has been commissioned by the World Organisation for Animal Health (OIE) to analyse the "Cost of National Prevention Systems for Animal Diseases and Zoonoses in Compliance with OIE International Standards on Quality of Veterinary Services, allowing early detection and rapid response to emerging and re-emerging diseases". For this aim we kindly ask you to complete this questionnaire.

The term "your department" in this questionnaire relates to the organisational unit of the Ministry specified below that is the Veterinary Authority[1] in your country (at the national level, not including sub-national units). Complementary questionnaires are available for your sub-national units (e.g. provincial public Veterinary Services) and other relevant institutions at national level (e.g. veterinary laboratory, if not part of your department). All quantitative data provided in this questionnaire should relate (if possible) to the year 2007.

If you have any further questions, do not hesitate to contact: Marie-Pascale Doré (*dore@civic-consulting.de*)
Phone: +49 30 2196 2295 Fax: +49 30 2196 2298

1. Please identify yourself:

a. Please verify the name and the English translation of the name of your Ministry:

###Name of Ministry### *Please correct, if necessary*

b. Please verify the name and English translation of the name of your department:

###Name of department### *Please correct, if necessary*

c. Questionnaire completed by:

Name, position, contact details

d. The data provided in this questionnaire relates to:

☐ Calendar year 2007 (01/01 – 31/12) ☐ Fiscal year 2007 *Please specify period*

General comments

[1] *Veterinary Authority* means the Governmental Authority, comprising veterinarians, other professionals and para-professionals, having the responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and guidelines in the OIE Terrestrial Animal Health Code in the whole country. All tasks and activities related to the Veterinary Authority and Veterinary Services as a whole are referred to in this questionnaire as *veterinary functions*.

DOCUMENTS REQUIRED

2. Please provide the following documents (preferably in English) as annexes to the completed questionnaire:

a. Detailed overview of the reported expenditure of your department in 2007.

☐ YES, document enclosed

Note: Please specify on the document whether the financial data provided also includes expenditures for non-veterinary tasks/services of your department.

b. Detailed overview of reported expenditures for specific veterinary programmes, in which you have been involved, in the period **2003 to 2007**, e.g. for specific prevention programmes, investment programmes, etc (including for the programmes listed under question 8).

☐ YES, document enclosed

c. Organisational chart of your department (updated version)

☐ YES, document enclosed

Note: In case that not all sub-units in your department have veterinary functions, please specify in the document all unit(s) that do have veterinary functions.

d. List of notifiable diseases in the country (Please specify for which diseases there is a contingency plan, and for which diseases prevention measures are in place)

☐ YES, document enclosed

e. Contingency plans for disease control (Please specify for which diseases).

☐ YES, document enclosed

f. Fee structure for compensation of private veterinarians conducting public service missions

☐ YES, document enclosed

g. Other documents:

Please specify other documents that you have enclosed

STAFF OF THE ###NAME OF DEPARTMENT### BY FUNCTION

3. **Please estimate the number of full-time equivalent staff members (FTE staff)[2] (national level only, i.e. not including sub-national units):**

		Number of full-time equivalent staff members (FTE)
A. Total number of staff members:		
B. Of this number, the total number of staff members with veterinary functions (veterinarians, veterinary para-professionals/technicians and other staff members) is:		
C. *Of the staff listed under B:* What is the estimated number of staff members assigned to the following veterinary functions (*Note*: In case that a staff member has several functions, please only consider the main function)		
	General functions	
	Legislation	
	International coordination (excluding international certification)	
	Communications (awareness and educational programs)	
	Emergency preparedness (emergency response plans, supplies, etc.)	
	Compensation of livestock holders (culling of diseased animals)	
	Registration, certification and accreditation	
	Registration of veterinary medicines	
	International certification	
	Accreditation of veterinarians that undertake public service missions	
	Support functions	
	In-service training of personnel of the Veterinary Services	
	National animal disease reporting/information system	
	Animal identification and traceability system	
	Risk assessment and scientific advice	
	Vaccination, eradication and surveillance programmes	
	Preventive vaccination programmes	
	Eradication and control programmes	
	Active surveillance programmes	
	Inspections and control	
	Border inspection posts (and quarantine)	
	Veterinary inspections (slaughterhouses)	
	Veterinary inspections (live animals markets)	
	Other veterinary inspections (e.g. dairy, other food establishments)	
	Veterinary laboratories	
	Domestic animal movement control	
	Total of staff assigned to listed functions	

Comments

[2] A full-time equivalent staff member (FTE) is defined as a full-time staff member working 40 hours per week. Part-time staff member or staff member working only partly on a specific function are calculated by dividing the total number of hours worked per week by 40 (e.g. a staff member working 20 hours per week has a FTE count of 0.5).

4. **Please provide the average monthly compensation per staff category and the number of staff members in that category working in your department:**

	Veterinarians	**Graduate personnel (non-veterinary)**	**Veterinary para-professional / veterinary technicians**	**Support personnel**
A. Average monthly compensation for one staff member (including wages, social contributions and non-wage income, i.e. in-kind payments, in national currency):				
B. Total number of staff members of your department by category:				
C. Of the number of staff members listed under B. the following staff members have veterinary functions:				

Comments

EXPENDITURES IN 2007

5. Please provide data on the reported expenditure for 2007 of your department (national level only, i.e. not including sub-national units):

Expenditure of department in 2007	**Total expenditure of department (in national currency)**
1. Operating expenditures[3]	
Compensation of employees *(including wages, social contributions and non-wage income, i.e. in-kind payments)*	
Material supplies *(e.g. veterinary drugs, vaccines, and other supplies such as stationary, fuel for vehicles)*	
Services (*e.g. fees for accredited private veterinarians who undertake public service missions, and if subcontracted, laboratory diagnostics, communications, training of employees)*	
Consumption of fixed capital *(reduction in the value of fixed assets, based on average service life of the asset, e.g. depreciation of cars, buildings, etc.)*	
Compensation of livestock holders *(for animals culled for disease control purposes)*	
Other current expenditures *(e.g. travel costs, per diems, interest, subsidies, maintenance, utilities, etc.)*	
Sum of operating expenditures	
2. Capital expenditures[4]	
Buildings *(e.g. office buildings, laboratory buildings, border inspection posts, veterinary clinics, other buildings)*	
Movable equipment *(e.g. computers, telecommunications equipment, vehicles, laboratory equipment)*	
Capital transfers[5] *(e.g. to other government institutions)*	
Sum of capital expenditures	

Comments

6. Please estimate the percentage of total reported expenditure of your department (as given in question 5) that is spent for veterinary functions:

Approximately   % of the total reported expenditure in 2007 are spent for veterinary functions

[3] Operating expenditures relate to day-to-day spending, i.e. spending on recurring items. This includes, for example, spending on consumables and everyday items that get used up as the good or service is provided.
[4] A capital expenditure is incurred when money is spent to buy fixed assets (e.g. lands, buildings and equipment) that are typically used over a long period of time.
[5] Capital transfers are transactions in-cash or in-kind, where the ownership of an asset is transferred from one institutional unit to another, or where cash is transferred to enable the recipient to acquire another asset, or where the funds realised by the disposal of another asset are transferred.

7. Please specify the operating expenditures of your department related to specific subcontracted services, for your department (national level only, i.e. not including sub-national units):

a. Fees for private veterinarians who undertook public service missions in 2007

Please specify

b. Expenses for subcontracted communication activities in 2007

Please specify

c. Expenses for subcontracted training of employees in 2007

Please specify

8. Have you implemented the following specific programmes in 2007?

a. Communication programmes implemented: ☐ YES ☐ NO

If yes, please specify diseases, expenses in 2007, and funding sources

Of the expenses in 2007 approx. ... % are already included in the reported expenditure (given in question 5)

b. Emergency response plan(s) prepared: ☐ YES ☐ NO

If yes, please specify diseases, expenses in 2007, and funding sources

Of the expenses in 2007 approx. ... % are already included in the reported expenditure (given in question 5)

c. Preventive vaccination programmes implemented: ☐ YES ☐ NO

If yes, please specify diseases, expenses in 2007, and funding sources

Of the expenses in 2007 approx. ... % are already included in the reported expenditure (given in question 5)

d. Eradication and control programmes implemented: ☐ YES ☐ NO

If yes, please specify diseases, expenses in 2007, and funding sources

Of the expenses in 2007 approx. ... % are already included in the reported expenditure (given in question 5)

e. <u>Active surveillance programmes</u> implemented: ☐ YES ☐ NO

If yes, please specify diseases, expenses in 2007, and funding sources

Of the expenses in 2007 approx. ... % are already included in the reported expenditure (given in question 5)

f. <u>Other programmes</u> implemented: ☐ YES ☐ NO

If yes, please specify diseases, expenses in 2007, and funding sources

Of the expenses in 2007 approx. ... % are already included in the reported expenditure (given in question 5)

9. Please provide a list of donor-financed programmes in 2007 regarding veterinary functions that are implemented in cooperation with your department:

Name of programme	Donor	Duration (from-to year)	Total budget and currency	Expenditure in 2007 (amount/ currency)

Comments

10. Would you consider the year 2007 an "average" year, in terms of expenditures, i.e. a year during which no exceptional expenses occurred?

☐ YES ☐ NO

If no, please specify reasons and explain to which degree expenses are higher or lower in a typical year

EQUIPMENT AND BUILDINGS

11. Please provide data on the movable equipment of your department in 2007:

Type of equipment	Total number	Estimated average age (years)
Office equipment		
Computer		
Laptop		
Printer		
Photocopier		
Telephone		
Fax		
Vehicles		
4 Wheel-Drive		
Car		
Freezer truck		
Freezer van		
Motorcycle /Moped		
Truck		
Other equipment (with a purchasing price of 1,000 USD or more)[6]		

Comments

12. Please list specific buildings used by staff of your department in 2007:

Type of building	Number of buildings	Approx. usable floor space (square meters), if readily available	Estimated average age (years)
Office building			
Storage building			
Laboratories			
Border inspections posts			
Other buildings (e.g. veterinary hospitals)			

Comments

[6] If needed, please provide a separate list.

12. a) **Please provide data on your capital stock (fixed assets) at the end of the year 2007 (national level only, i.e. not including sub-national units):**

Capital stock (end of year 2007)	**Value of capital stock (in national currency)**
Buildings	
Transport	
Furniture	
Laboratory equipment	
Sum of capital stock (end of year 2007)	

Comments

COUNTRY BACKGROUND INFORMATION

13. **What are critical animal disease risks/problems in your country?**

Please specify

14. **How would you assess that these critical animal disease risks/problems in your country affect the expenditures of your department regarding veterinary functions?**

Please specify

15. **How would you assess that other factors in your country, e.g. livestock density, prevalent production systems and bio-security measures of the private sector, affect the expenditures of your department regarding veterinary functions?**

Please specify

16. **Please provide the number of private veterinarians in your country:**

a. Estimated total number of private veterinarians in your country:

Please specify

b. Estimated number of accredited private veterinarians in your country who undertake public service missions (e.g. veterinary inspections in slaughterhouses):

Please specify

c. Estimated number of private veterinarians in your country who mainly provide animal health services to livestock producers:

Please specify

d. Estimated number of private veterinary para-professionals[7] including Community Animal Health Workers in your country:

Please specify

[7] A Veterinary Para-professional means a person who, for the purpose of the OIE Terrestrial Animal Health Code, is authorised by the veterinary statutory body to carry out certain designated tasks, and delegated to them under the responsibility and direction of a veterinarian.

Annex 4: Description of major animal diseases

Disease	Host	Virulence	Prevention and Control	Occurrence of the disease in World (from 01/01/05 to 10/02/07)
Highly pathogenic avian influenza (HPAI)	All domestic and wild avian species are susceptible to infection. Other species can be affected but the infection remains generally unapparent (pig, horse, cats). Humans can become infected from contact with the birds, and death has occurred in some cases (HPAI). However, no human to human transmission yet.	HP viruses cause severe, systemic disease with high mortality in chickens, turkeys, and other gallinaceous birds.	• No treatment **Sanitary prophylaxis** • Avoidance of contact between poultry and wild birds, in particular waterfowl • Avoidance of the introduction of birds of unknown disease status into flock • Control of human traffic • Proper cleaning and disinfection procedures • One age group per farm ('all in-all out') breeding is recommended **In outbreaks** • Slaughtering of all birds • Disposal of carcasses and all animal products • Cleaning and disinfection • Allow at least 21 days before restocking **Medical prophylaxis** • vaccines have been employed to combat rapidly spreading disease	HPAI occurs worldwide and different strains are more prevalent in certain areas of the world than others. Outbreaks began in south-east Asia 2003. Over the past years, several other Asian countries have reported outbreaks. Outbreaks have also been reported in Africa and Europe.
Foot and mouth disease **(FMD)**	Bovidae, swine, sheep, goats, buffalo, and all wild ruminants and suidae. Camelidae have low susceptibility.	In a susceptible population, morbidity approaches 100%. The disease is rarely fatal except in young animals.	**Sanitary prophylaxis** • Protection of free zones by border animal movement control and surveillance • Slaughter of infected, recovered, and FMD-susceptible contact animals • Disinfection of premises and all infected material (implements, cars, clothes, etc.) • Destruction of cadavers, litter, and susceptible animal products in the infected area • Quarantine measures **Medical prophylaxis** • Inactivated virus vaccine	FMD is endemic in parts of Asia, Africa, the Middle East and South America (sporadic outbreaks in free areas).

Disease	**Host**	**Virulence**	**Prevention and Control**	**Occurrence of the disease in World (from 01/01/05 to 10/02/07)**
Peste de petits Ruminants	Goats and sheep. Cattle and pigs develop unapparent infections.	Morbidity (90%) and mortality (50-80%) rates are higher in young animals than in adults.	• No specific treatment • Movement control and quarantine • Rinderpest vaccine is commonly used. Recently, a homologous PPR vaccine has been developed • Slaughter of infected animals • Destruction of carcasses • Disinfection	PPR occurs in Africa, the Arabian Peninsula, the Middle East and Turkey.
Contagious Bovine Pleuropneumonia **(CBPP)**	Cattle, zebu and buffalo. Wild bovids and camels are resistant.	Mortality rates can reach 50% in early stages. During an outbreak only 33% of animals present symptoms (hyperacute or acute forms), 46% are infected but have no symptoms (sub-clinical forms) and 21% seem to be resistant.	• No efficient treatment **In disease-free areas:** • Quarantine, • Surveillance (blood testing) • Slaughtering of all animals of the herd in which positive animals have been found • Control of cattle movements **In infected areas:** • Vaccination	CBPP is widespread in Africa. The disease was suspected (not confirmed) in 2005 in Mongolia.
Bluetongue	Sheep. Cattle, goats, dromedaries, wild ruminants: generally unapparent infection.	Mortality rate normally low in sheep but up to 10% in some epizooties (OIE).	• No efficient treatment **Disease free areas:** • Quarantine • Serological survey • Vector control **Infected areas:** • Vector control • Prophylactic vaccination	During 2006 the disease has occurred in North Africa, Europe and Middle East (Israel). It has also been reported in Saudi Arabia, Latin America and Caribbean.

Disease	**Host**	**Virulence**	**Prevention and Control**	**Occurrence of the disease in World (from 01/01/05 to 10/02/07)**
Classical swine fever	Pigs and wild boars.	Virulence varies from severe, with high mortality, to mild or even subclinical. Fatal to young, chronic for adults.	• No treatment • Strict import policy for live pigs, and fresh and cured pig meat • Quarantine of pigs before admission into herd • Efficient sterilisation (or prohibition) of waste food fed to pigs • Serological surveillance targeted to breeding sows and boars • Prophylactic vaccination where classical swine fever is enzootic **Response to outbreaks** • Slaughter of all pigs on affected premises • Proper disposal of carcases • Disinfection • Designation of infected zone, with control of pig movements • Detailed epidemiological investigation • Surveillance of infected zone, and surrounding area	CFS occurs in Latin and Central America, in parts of Europe, Asia and Africa.
Newcastle Disease	Birds, both domestic and wild. A carrier state may exist in some wild birds.	The mortality and morbidity rates vary among species, and with the strain of virus.	• No treatment • Vaccination for permanent immunity • Avoidance of contact with birds of unknown health status • One age group per farm ('all in-all out') breeding is recommended • Strict isolation of outbreaks • Destruction of all infected and exposed birds • Proper disposal of carcasses • Disinfection • 21 days before restocking • Control of human traffic	Newcastle Disease have been reported in Asia, Africa (most sub-Saharan), Middle East and Europe.
Brucellosis	It primarily affects cattle, swine, sheep and goats, buffalo, bison, camels, elk, dogs and occasionally horses. It may also infect other ruminants, some marine mammals and humans.	The disease in animals is characterized by abortions or reproductive failure. While animals typically recover, and will be able to have live offspring following the initial abortion, they may continue to	**Animal brucellosis** • Surveillance using serological tests • Tests on milk (milk ring test) for screening and elimination campaigns • Individual animal testing both for trade and for disease control purposes • In endemic areas, vaccination campaigns to reduce the incidence of infection • Test and stamping out program **Human brucellosis** • Prevention through control of infection in animals	The highest incidence is observed in the Middle East, the Mediterranean region, sub-Saharan Africa, China, India, Peru, and Mexico. Currently, countries in central and southwest Asia are seeing the greatest increase in

Disease	Host	Virulence	Prevention and Control	Occurrence of the disease in World (from 01/01/05 to 10/02/07)
		shed the bacteria.	• Pasteurisation of milk from infected animals	cases.
Bovine tuberculosis	Although cattle are considered to be the true hosts, the disease has been reported in many other domesticated and non-domesticated animals. This disease can affect practically all mammals.	Usual clinical signs include: weakness, loss of appetite, weight-loss, fluctuating fever, intermittent hacking cough, diarrhea, large prominent lymph nodes. However, the bacteria can also lie dormant in the host without causing disease. This disease causes a general state of illness, coughing and eventual death.	• The standard control measure is test and slaughter **Disease eradication programs consisting of:** • post mortem meat inspection • intensive surveillance, including on-farm visits • systematic individual testing of cattle • removal of infected and in-contact animals • movement controls **Preventive measures** • Pasteurisation of milk of infected animals (prevent spread of disease in humans) • Treatment of infected animals is rarely attempted (high cost, lengthy, etc.) • Vaccination is practiced in human medicine, but it is not widely used in animals	The diseases is found throughout the world. The disease is more prevalent in most of Africa, parts of Asia and of the Americas.
Rabies	Warm-blooded animals, including humans.	Viral disease that affects the central nervous system of warm-blooded animals, including humans. The disease has a long incubation period (six months) and symptoms may take several weeks to appear after infection. However, once symptoms appear, rabies is always fatal in animals.	**Prevention and control measures include:** • Surveillance and reporting of suspected cases of rabies in animals • Vaccination programs for domestic animals • Research into disease dynamics, vaccines and effective delivery mechanisms for target populations • Wildlife rabies control programs including vaccination (trap/vaccinate/release or delivery of oral vaccines • Population control and vaccination programs for stray animal populations	The rabies virus is present on all continents except Antarctica.

Disease	**Host**	**Virulence**	**Prevention and Control**	**Occurrence of the disease in World (from 01/01/05 to 10/02/07)**
Bovine spongiform encephalopathy BSE)	Bovidae and felidae. Experimentally transmissible to cattle, pigs, sheep, goats, mice, mink, marmosets and macaque monkeys.	BSE is a fatal disease and euthanasia on welfare grounds is necessary.	• There is no effective treatment and clinically suspect cases must be killed by lethal injection to avoid damage to brain tissue sampled for diagnosis **Sanitary prophylaxis** *Free countries* • Targeted pathological surveillance to occurrences of clinical neurological disease • Safeguards on importation of live ruminant species and their products • Policy and procedures for importation of embryos *Countries with cases in cattle* • Slaughter and compensation for ascertainment of cases • Controls on recycling of mammalian protein • Effective identification and tracing of cattle	The primary common source epidemic occurred in Great Britain. Cases of BSE have occurred in a number of other countries as a result of the export of infected cattle or infected MBM from Great Britain.

Source: OIE WAHID, OIE Terrestrial Animal Health Code and Technical Disease Cards, FAO, the Merck Veterinary Manual

Note: This table was prepared in the context of the study to facilitate the understanding of the reader. It is not exhaustive and does not in any way reflect an official position of the sources mentioned.

Annex 5: Data on animal disease outbreaks in case study countries

Annex 5-1. Costa Rica

WAHID Interface Animal Health Information / Information zoosanitaire / Información Zoosanitaria

OIE Home Page

Language: English

Back

ANNUAL REPORT ON THE NOTIFICATION OF THE ABSENCE OR PRESENCE OF ALL DISEASES		
OIE Reference: 592, 23182, 31472, 35716	Report period: Jan - Dec 2007	Country: Costa Rica, Republic of

Report Summary

Animal Type	Terrestrial and Aquatic	Date of report	10/3/2008
Submitted	Report Submitted	Report period	Jan - Dec 2007
Name of Sender of the report	Sandí Muñoz Alexis	Address	Del Cementerio de Jardines del Recuerdo, 2.5 km oeste. Campus Universitario Benjamín Núñez, Lagunilla HEREDIA
Position	Jefe Epidemiología	Telephone	(506) 2620221
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Entered by	Sandí Muñoz Alexis (CRI)		

1. Present Diseases

Multiple species

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Vesicular stomatitis	+	New Jersey	16	16	bov	* T GSu Qf	1 783	61	0	0	0	0	0
					buf	Qf T GSu *						0	
					cap	T						0	
					cml	T						0	
					equ	* GSu T Qf						0	
					o/c	Qf * T GSu						0	
					ovi	T						0	
					sui	Qf * GSu T						0	
					fau	T						0	
Bluetongue	+?		...	...	bov	GSu * Qf						0	
					buf								
					cap								
					cml								
					o/c	* GSu Qf						0	
					ovi								
					fau								
Anthrax	+		...	...	bov	* GSu Qf V						0	
					buf	V GSu * Qf						0	
					cap								
					cml								
					equ	GSu * V Qf						0	
					o/c	* Qf GSu V						0	
					ovi								
					sui	* Qf GSu V						0	
					fau								
Leptospirosis	+		6	6	bov	V GSu * Qf	310	16	0	0	0	0	0
					buf	Qf *						0	
					can	GSu * Qf V						0	
					cap	Qf GSu *						0	
					cer	* Qf						0	
					equ	Qf *						0	
					o/c	* Qf						0	
					ovi	Qf *						0	
					sui	* GSu Qf						0	
Rabies	+		1	1	bov	GSu * V Qf	800	4	4	0	0	2 859	796
					buf	Qf GSu *						0	
					can	Qf * GSu V						0	
					cap	GSu * Qf						0	
					cer	Qf GSu *						0	
					cml	Qf * GSu						0	
					equ	* GSu Qf						0	
					fel	Qf * GSu						0	

					lep	* GSu Qf						0	
					o/c	Qf * GSu						0	
					ovi	* GSu Qf						0	
					sui	* Qf GSu						0	
					fau	Qf GSu *						0	
Paratuberculosis	+		...	...	bov	GSu * Qf						0	
					buf								
					cap								
					o/c								
					ovi								
Brucellosis (Brucella abortus)	+		140	140	bov	V GSu * Sp Te Qf	12 975	888	0	0	888	48 881	3 818
					buf	Qf Te GSu Sp *						0	
					cml	* Qf						0	
					fau	Qf *						0	
Cattle													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Bovine anaplasmosis	+		...	...	bov	Qf * T GSu						0	
					buf	GSu * Qf T						0	
					fau								
Bovine babesiosis	+		...	...	bov	Qf GSu * T						0	
					buf	T GSu * Qf						0	
					fau								
Bov. genital campylobacteriosis	+		...	...	bov	Qf * T GSu						0	
					buf	* T GSu Qf						0	
					ovi								
					fau								
Bovine tuberculosis	+		1	1	bov	Sp * GSu Te Qf	25	1	0	1	0	0	0
					buf	GSu Te Sp Qf *						0	
					cap	* Qf						0	
					cer	Qf *						0	
					cml	Qf *						0	
					o/c	Qf *						0	
					ovi	* Qf						0	
					fau	Qf *						0	
Enzootic bovine leukosis	+		21	21	bov	Qf * GSu	1 478	98	0	0	0	0	0
Inf.bov.rhinotracheit. (IBR/IPV)	+		19	19	bov	GSu Qf *	1 841	74	0	0	0	0	0
Trichomonosis	+		...	...	bov	* T GSu Qf						0	
Sheep/Goats													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Caprine arthritis/encephalitis	?		...	...	cap	GSu * Qf						0	
Swine													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Porcine reproductive/respiratory syndr.	+		...	...	sui	Qf * GSu						0	
Equidae													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Equine infectious anaemia	+		155	155	equ	GSu Sp * Qf	928	221	0	106	115	0	0
Equine piroplasmosis	+		...	...	equ	Qf * GSu						0	
Lagomorphs													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Myxomatosis	+		...	...	lep	Qf * GSu						0	
					fau								
Birds													

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Avian infectious bronchitis	+		2	2	avi	GSu Qf *	94	2	2	0	0	0	0
Avian infect. laryngotracheitis	+		3	3	avi	Te Qf V Sp Z GSu Qi TSu *	41 347	525	0	0	0	695 000	0
Infec bursal disease (Gumboro)	+		...	...	avi	Qf * GSu						0	
Marek's disease	+		...	...	avi	Qf GSu *						0	
Mycoplasmosis (M. gallisepticum)	+		1	1	avi	GSu Qf *	66	1	0	0	0	0	0
					fau								

Bees

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Acarapisosis of honey bees	+		...	...	api	Qf * T GSu						0	
American foulbrood of honey bees	+		1	1	api	Qf * T GSu	78	1	0	0	0	0	0
European foulbrood of honey bees	+		21	21	api	T Qf GSu *	914	31	0	0	0	0	0
Varroosis of honey bees	+		31	31	api	* T GSu Qf	2 049	61	0	0	0	0	0

Fish

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Gyrodactylosis (Gyrodactylus salaris)	+		6	6	pis	Qf * GSu	3 010 000	908 000	900 000	3 000	0	0	0
					fau								

Crustaceans

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Taura syndrome	+		...	...	cru	Qf GSu *						0	
					fau								
White spot disease	+		4	4	cru	* GSu Qf	8 160 000	3 336 000	3 336 000	0	4 824 000	0	0
					fau								
Infectious hypodermal and haematopoietic necrosis	+		5	5	cru	GSu * Qf	20 000 000	5 000 000	1 000 000	0	10 000 000	0	0
					fau								

2. Absent Diseases

Multiple species

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Foot and mouth disease	0000	bov	GSu S Vp * Qi Qf	0
		buf	GSu S Qi Vp * Qf	0
		cap	* Vp GSu S Qi Qf	0
		cml	S Qi Vp Qf * GSu	0
		o/c	* Vp Qf S Qi GSu	0
		ovi	* GSu Vp Qf S Qi	0
		sui	* Vp S Qi Qf GSu	0
		fau	* Vp GSu Qf S Qi	0
Rinderpest	0000	bov	* Qf	0
		buf	* Qf	0
		cap	* Qf	0
		o/c	Qf *	0
		ovi	* Qf	0
		fau		
Rift Valley fever	0000	bov	* Qf	0
		buf	Qf *	0
		cap	* Qf	0
		cml	* Qf	0
		o/c	* Qf	0
		ovi	Qf *	0
		fau	Qf *	0
Aujeszky's disease	-	bov		
		can		

		cap		
		o/c		
		ovi		
		sui	* Qf	0
		fau		
Echinococcosis/hydatidosis	0000	bov	Qf *	0
		buf		
		cap		
		cer		
		cml		
		equ		
		o/c		
		ovi		
		sui		
		fau		
Heartwater	0000	bov	Qf *	0
		buf		
		cap		
		o/c		
		ovi		
		fau		
Q fever	0000	bov	Qf *	0
		buf		
		cap	Qf *	0
		o/c		
		ovi	Qf *	0
		fau		
N. w. screwworm (C. hominivorax)	1999	avi	* GSu Qf	0
		bov	GSu * Qf	0
		buf	Qf GSu *	0
		can	* GSu Qf	0
		cap	GSu * Qf	0
		cml	* GSu Qf	0
		equ	GSu * Qf	0
		fel	GSu * Qf	0
		lep	GSu * Qf	0
		o/c	GSu * Qf	0
		ovi	GSu * Qf	0
		sui	GSu * Qf	0
		fau	Qf * GSu	0
O. w. screwworm (C. bezziana)	0000	avi	* Qf	0
		bov	Qf *	0
		buf	Qf *	0
		can	* Qf	0
		cap	* Qf	0
		cml	* Qf	0
		equ	Qf *	0
		fel	* Qf	0
		lep	Qf *	0
		o/c	* Qf	0
		ovi	Qf *	0
		sui	* Qf	0
		fau	Qf *	0
Japanese encephalitis	0000	equ	Qf *	0
		sui		
Tularemia	0000	lep	Qf *	0
		fau		
Crimean Congo haemorrhagic fever	0000	avi		
		bov	Qf *	0
		buf		
		can		
		cap		
		cer		

		cml		
		equ		
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		
West Nile Fever	0000	avi	Qf GSu *	0
		bov		
		buf		
		can		
		cap		
		cer		
		cml		
		equ	* Qf GSu	0
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		
Cattle				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Contagious bov. pleuropneumonia	0000	bov	Qf *	0
		buf		
		cap		
		o/c		
		ovi		
Lumpy skin disease	0000	bov	* Qf	0
		buf		
		fau		
Haemorrhagic septicaemia	0000	bov	Qf *	0
		buf		
Theileriosis	0000	bov	Qf *	0
		buf		
		cap		
		o/c		
		ovi		
		fau		
Trypanosomosis	0000	bov	* Qf	0
		buf		
		cap		
		cml		
		o/c		
		ovi		
		fau		
Bovine spongiform encephalopathy	0000	bov	* GSu TSu Qf	0
Sheep/Goats				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Peste des petits ruminants	0000	bov		
		cap	* Qf	0
		o/c	* Qf	0
		ovi		
		sui		
		fau		
Sheep pox and goat pox	0000	cap		
		o/c	* Qf	0
		ovi		
		fau		
Ovine epididymitis (B. ovis)	0000	ovi	Qf *	0
Contagious agalactia	0000	cap		
		o/c	Qf *	0

		ovi		
Contagious cap. pleuropneumonia	0000	cap	* Qf	0
Enzootic abortion (chlamydiosis)	0000	cap		
		o/c		
		ovi	* Qf	0
Nairobi sheep disease	0000	cap		
		o/c	* Qf	0
		ovi		
Salmonellosis (S. abortusovis)	0000	ovi	Qf *	0
Scrapie	0000	cap		
		o/c	* Qf	0
		ovi		
Maedi-visna	0000	ovi	Qf *	0
Contagious pustular dermatitis	0000	buf	Qf	0
		cap	Qf	0
		cml	Qf	0
		o/c	Qf	0
		ovi	Qf	0
		fau	Qf	0
Contagious ophthalmia	0000	cap	Qf	0
		o/c	Qf	0
		ovi	Qf	0
		fau	Qf	0
Swine				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Swine vesicular disease	0000	sui	Qf *	0
		fau		
African swine fever	0000	sui	Qf *	0
		fau		
Classical swine fever	1997	sui	Qf TSu S Vp GSu *	0
		fau		
Nipah virus encephalitis	0000	sui	Qf *	0
Equidae				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
African horse sickness	0000	equ	* Qf	0
		fau		
Contagious equine metritis	0000	equ	* Qf	0
Dourine	0000	equ	Qf *	0
Equine rhinopneumonitis	0000	equ	* Qf	0
Glanders	0000	equ	* Qf	0
Equine viral arteritis	0000	equ	Qf *	0
Surra (Trypanosoma evansi)	0000	bov		
		buf		
		cml		
		equ	* Qf	0
Equine coital exanthema	0000	equ	Qf	0
Lagomorphs				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Rabbit haemorrhagic disease	0000	lep	* Qf	0
		fau		
Birds				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Highly path. avian influenza	0000	avi	Qf S Vp GSu * TSu	0
		fau		
Newcastle disease	1990	avi	TSu Qf GSu * S	0
		fau		
Duck virus hepatitis	0000	avi	Qf *	0
Avian chlamydiosis	0000	avi	Qf *	0
Low pathogenic avian influenza (poultry)	0000	avi	GSu * Vp Qf TSu S	0
Bees				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Tropilaelaps infestation of honey bees	0000	api	Qf *	0
Small hive beetle infestation	0000	api	* Qf	0

Other				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Camelpox	0000	cml	Qf *	0
Fish				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Viral haemorrhagic septicaemia	0000	pis	Qf *	0
		fau		
Spring viraemia of carp	0000	pis	Qf *	0
		fau		
Infect. haematopoietic necrosis	0000	pis	Qf *	0
		fau		
Epizoot. haematopoietic necrosis	0000	pis	Qf *	0
		fau		
Infectious salmon anaemia	0000	pis	Qf *	0
		fau		
Epizootic ulcerative syndrome	0000	pis	Qf *	0
		fau		
Red sea bream iridoviral disease	0000	pis	Qf *	0
		fau		
Molluscs				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Infection with Bonamia ostreae	0000	mol	Qf *	0
		fau		
Infection with Bonamia exitiosa	0000	mol	* Qf	0
		fau		
Infection with Marteilia refringens	0000	mol	* Qf	0
		fau		
Infection with Perkinsus marinus	0000	mol	* Qf	0
		fau		
Crustaceans				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Yellow head disease	0000	cru	* Qf	0
		fau		
Crayfish plague (Aphanomyces astaci)	0000	cru	* Qf	0
		fau		

3. Detailed quantitative information for OIE-listed diseases/infections present in Costa Rica

Disease information by State by month from Report Year 2007

Vesicular stomatitis

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Aug	PUNTARENAS	New Jersey	1	1	bov	18	1	0	0	0	0
Oct	ALAJUELA	New Jersey	5	5	bov	451	13	0	0	0	0

Leptospirosis

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	ALAJUELA		1	1	bov	115	7	0	0	0	0
Oct	SAN JOSE		1	1	bov	35	2	0	0	0	0
Nov	SAN JOSE		1	1	bov	8	2	0	0	0	0

Enzootic bovine leukosis

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	ALAJUELA		1	1	bov	115	8	0	0	0	0
Aug	LIMON		1	1	bov	50	2	0	0	0	0
	SAN JOSE		4	4	bov	88	4	0	0	0	0
Sep	SAN JOSE		1	1	bov	211	1	0	0	0	0
Oct	CARTAGO		1	1	bov	5	1	0	0	0	0
Dec	SAN JOSE		1	1	bov	50	4	0	0	0	0

Inf.bov.rhinotracheit. (IBR/IPV)

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	SAN JOSE		1	1	bov	15	1	0	0	0	0
Aug	ALAJUELA		1	1	bov	15	2	0	0	0	0
	SAN JOSE		2	2	bov	41	4	0	0	0	0

Oct	SAN JOSE		1	1	bov	35	1	0	0	0	0
Nov	GUANACASTE		1	1	bov	800	2	0	0	0	0
	PUNTARENAS		1	1	bov	325	2	0	0	0	0
	SAN JOSE		3	3	bov	156	3	0	0	0	0
Dec	SAN JOSE		4	4	bov	88	8	0	0	0	0

Equine infectious anaemia

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	ALAJUELA		1	1	equ	10	2	0	0	2	0
	CARTAGO		1	1	equ	1	1	0	0	1	0
	PUNTARENAS		4	4	equ	18	5	0	0	5	0
Aug	ALAJUELA		1	1	equ	1	1	0	0	1	0
	PUNTARENAS		8	8	equ	24	9	0	0	9	0
	SAN JOSE		9	9	equ	31	8	0	0	8	0
Sep	ALAJUELA		2	2	equ	13	2	0	0	2	0
	PUNTARENAS		11	11	equ	93	16	0	0	16	0
	SAN JOSE		5	5	equ	7	5	0	0	5	0
Oct	ALAJUELA		2	2	equ	2	2	0	0	2	0
	PUNTARENAS		6	6	equ	42	9	0	0	9	0
	SAN JOSE		2	2	equ	8	5	0	0	5	0
Nov	GUANACASTE		2	2	equ	7	2	0	0	2	0
	PUNTARENAS		5	5	equ	17	6	0	0	6	0
	SAN JOSE		3	3	equ	4	4	0	0	4	0
Dec	ALAJUELA		3	3	equ	5	4	0	0	4	0
	PUNTARENAS		12	12	equ	104	25	0	0	25	0
	SAN JOSE		8	8	equ	12	9	0	0	9	0

Avian infect. laryngotracheitis

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	ALAJUELA		1	1	avi	40 000	500	0	0	0	0

White spot disease

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Dec	GUANACASTE		3	3	cru	4 200 000	2 940 000	2 940 000	0	1 260 000	0

European foulbrood of honey bees

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Nov	PUNTARENAS		1	1	api	60	1	0	0	0	0
Dec	ALAJUELA		9	9	api	420	15	0	0	0	0
	PUNTARENAS		2	2	api	70	2	0	0	0	0
	SAN JOSE		1	1	api	64	3	0	0	0	0

Varroosis of honey bees

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Sep	ALAJUELA		1	1	api	10	2	0	0	0	0
Nov	PUNTARENAS		1	1	api	200	26	0	0	0	0
Dec	ALAJUELA		9	9	api	444	12	0	0	0	0
	PUNTARENAS		2	2	api	70	3	0	0	0	0
	SAN JOSE		1	1	api	64	1	0	0	0	0

Gyrodactylosis (Gyrodactylus salaris)

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Sep	ALAJUELA		1	1	pis	10 000	8 000	0	0	0	0

Brucellosis (Brucella abortus)

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	ALAJUELA		2	2	bov	520	3	0	0	3	0
	HEREDIA		4	4	bov	89	9	0	0	9	0
Aug	ALAJUELA		13	13	bov	1 225	92	0	0	92	0
	CARTAGO		4	4	bov	238	10	0	0	10	0
	LIMON		1	1	bov	150	1	0	0	1	0
	PUNTARENAS		3	3	bov	570	3	0	0	3	0
	SAN JOSE		5	5	bov	175	15	0	0	15	0
Sep	ALAJUELA		7	7	bov	1 472	149	0	0	149	0
	CARTAGO		2	2	bov	17	2	0	0	2	0

	LIMON		1	1	bov	28	2	0	0	2	0
	PUNTARENAS		1	1	bov	4	1	0	0	1	0
Oct	ALAJUELA		6	6	bov	779	39	0	0	39	0
	CARTAGO		1	1	bov	10	1	0	0	1	0
	HEREDIA		2	2	bov	520	9	0	0	9	0
	LIMON		3	3	bov	546	4	0	0	4	0
	SAN JOSE		2	2	bov	146	8	0	0	8	0
Nov	ALAJUELA		1	1	bov	24	8	0	0	8	0
	HEREDIA		2	2	bov	218	28	0	0	28	0
	SAN JOSE		3	3	bov	145	9	0	0	9	0
Dec	ALAJUELA		15	15	bov	2 049	117	0	0	117	0
	CARTAGO		3	3	bov	70	5	0	0	5	0
	HEREDIA		1	1	bov	152	7	0	0	7	0
	SAN JOSE		2	2	bov	10	2	0	0	2	0

Disease information for Report Year 2007

Vesicular stomatitis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	New Jersey	10	10	bov	1 314	47	0	0	0	0

Leptospirosis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		3	3	bov	152	5	0	0	0	0

Rabies

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		1	1	bov	800	4	4	0	0	796

Bovine tuberculosis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		1	1	bov	25	1	0	1	0	0

Enzootic bovine leukosis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		12	12	bov	959	78	0	0	0	0

Inf.bov.rhinotracheit. (IBR/IPV)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		5	5	bov	366	51	0	0	0	0

Equine infectious anaemia

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		70	70	equ	529	106	0	106	0	0

Avian infectious bronchitis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		2	2	avi	94	2	2	0	0	0

Avian infect. laryngotracheitis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		2	2	avi	1 347	25	0	0	0	0

Mycoplasmosis (M. gallisepticum)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		1	1	avi	66	1	0	0	0	0

White spot disease

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		1	1	cru	3 960 000	396 000	396 000	0	3 564 000	0

American foulbrood of honey bees

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		1	1	api	78	1	0	0	0	0

European foulbrood of honey bees

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		8	8	api	300	10	0	0	0	0

Varroosis of honey bees

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		17	17	api	1 261	17	0	0	0	0

Gyrodactylosis (Gyrodactylus salaris)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		5	5	pis	3 000 000	900 000	900 000	3 000	0	0

Infectious hypodermal and haematopoietic necrosis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated

Jan		5	5	cru	20 000 000	5 000 000	1 000 000	0	10 000 000	0

Brucellosis (Brucella abortus)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		56	56	bov	3 818	364	0	0	364	3 818

Disease information for Report Year 2007

Nosemosis of bees

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	13	13	api	543	28	0	0	0	0

4. Unreported Diseases

Multiple species		
Trichinellosis	Listeriosis	Toxoplasmosis
Blackleg	Botulism	Other clostridial infections
Other pasteurelloses	Actinomycosis	Intestinal Salmonella infections
Coccidiosis	Distomatosis (liver fluke)	Filariosis
Enterotoxaemia	Salmonellosis (S. abortusequi)	Brucellosis
Salmonellosis	Brucellosis (Brucella melitensis)	Brucellosis (Brucella suis)
Cattle		
Bovine brucellosis	Bovine cysticercosis	Dermatophilosis
Mucosal disease/DVB	Warble infestation	Bovine viral diarrhoea
Sheep/Goats		
Ovine pulmonary adenomatosis	Foot-rot	Caseous lymphadenitis
Sheep mange		
Swine		
Atrophic rhinitis of swine	Porcine cysticercosis	Transmissible gastroenteritis
Enterovirus encephalomyelitis	Melioidosis	Vibrionic dysentery
Swine erysipelas		
Equidae		
Epizootic lymphangitis	Equine influenza	Horse pox
Horse mange	Venezuelan equ.encephalomyelitis	Ulcerative lymphangitis
Strangles	Encephalomyelitis (East.)	Encephalomyelitis (West.)
Birds		
Avian tuberculosis	Duck virus enteritis	Fowl cholera
Fowl pox	Fowl typhoid	Pullorum disease
Infectious coryza	Avian encephalomyelitis	Avian spirochaetosis
Other avian salmonellosis	Avian leukosis	Turkey rhinotracheitis
Avian mycoplasmosis (M.synoviae)		
Other		
Leishmaniosis		
Fish		
Koi herpesvirus disease		
Molluscs		
Abalone viral mortality		
Crustaceans		
Spherical baculovirosis (Penaeus monodon-type baculovirus)	Tetrahedral baculovirosis (Baculovirus penaei)	

5. Zoonoses in Humans

Disease Name	Present diseases	Cases	Deaths
Anthrax	+(?)	+(?)	
Avian chlamydiosis	-	-	
Botulism	+(?)	+(?)	
Bovine cysticercosis	...	...	
Bovine tuberculosis	-	-	
Brucellosis	+	31	0
Campylobacteriosis	+(?)	+(?)	
Crimean Congo haemorrhagic fever	-	-	
Ebola haemorrhagic fever	-	-	
Echinococcosis/hydatidosis	-	-	
Escherichia coli O157	-	-	
Glanders	-	-	
Hantavirus pulmonary syndrome	-	-	
Highly pathogenic avian influenza	-	-	

Japanese encephalitis	-	-	
Leishmaniosis	+	1 606	0
Leptospirosis	+	96	0
Listeriosis	...	...	
Marburg haemorrhagic fever	-	-	
Monkey pox	-	-	
New variant Creutzfeldt-Jakob disease	-	-	
New world screwworm (Cochliomyia hominivorax)	-	-	
Nipah virus encephalitis	-	-	
Old world screwworm (Chrysomya bezziana)	-	-	
Porcine cysticercosis	...	...	
Q fever	-	-	
Rabies	-	-	
Rift Valley fever	-	-	
Salmonellosis	+	87	0
Swine erysipelas	+(?)	+(?)	
Toxoplasmosis	...	...	
Trichinellosis	+(?)	+(?)	
Tularemia	-	-	
Venezuelan equine encephalomyelitis	-	-	
West Nile Fever	-	-	

6. Animal population

Species	Administrative region	Totals	Units	Number	Units
Bees	ALAJUELA	4 616	Apiaries	100	Animals
	CARTAGO	180	Apiaries	4	Animals
	GUANACASTE	9 890	Apiaries	249	Animals
	HEREDIA	0	Apiaries	...	Animals
	LIMON	0	Apiaries	...	Animals
	PUNTARENAS	3 682	Apiaries	133	Animals
	SAN JOSE	8 306	Apiaries	92	Animals
Birds	ALAJUELA	12 158 938	Establishments	483	Animals
	CARTAGO	0	Establishments	...	Animals
	GUANACASTE	0	Establishments	...	Animals
	HEREDIA	347 600	Establishments	27	Animals
	LIMON	0	Establishments	...	Animals
	PUNTARENAS	0	Establishments	...	Animals
	SAN JOSE	1 597 000	Establishments	89	Animals
Cattle	ALAJUELA	408 365	Establishments	14 223	Animals
	CARTAGO	43 653	Establishments	1 965	Animals
	GUANACASTE	323 489	Establishments	7 563	Animals
	HEREDIA	66 739	Establishments	2 538	Animals
	LIMON	179 579	Establishments	6 307	Animals
	PUNTARENAS	257 557	Establishments	8 295	Animals
	SAN JOSE	90 333	Establishments	5 749	Animals
Crustaceans	ALAJUELA	0	Establishments	...	Tonnes
	CARTAGO	0	Establishments	...	Tonnes
	GUANACASTE	2 164	Establishments	47	Tonnes
	HEREDIA	0	Establishments	...	Tonnes
	LIMON	0	Establishments	...	Tonnes
	PUNTARENAS	2 564	Establishments	71	Tonnes
	SAN JOSE	0	Establishments	...	Tonnes
Fish	ALAJUELA	1 112	Establishments	792	Tonnes
	CARTAGO	152	Establishments	138	Tonnes
	GUANACASTE	14 200	Establishments	30	Tonnes
	HEREDIA	111	Establishments	73	Tonnes
	LIMON	846	Establishments	31	Tonnes
	PUNTARENAS	88	Establishments	24	Tonnes
	SAN JOSE	265	Establishments	232	Tonnes
Swine	ALAJUELA	114 907	Establishments	3 773	Animals
	CARTAGO	31 138	Establishments	344	Animals
	GUANACASTE	42 562	Establishments	2 440	Animals
	HEREDIA	11 148	Establishments	595	Animals
	LIMON	33 783	Establishments	1 976	Animals

	PUNTARENAS	53 023	Establishments	2 715	Animals
	SAN JOSE	49 767	Establishments	878	Animals

7. Personnel

Veterinarians:

	Public administration	Both	Private accredited practitioners
Animal health activities	96		80
Public Health activities (abattoirs, food hygiene, etc,)	17		46
Laboratories	9		0
Academics or Training Institutions		84	
Private practitioners in the pharmaceutical industry		217	
Independent Private Veterinarians		563	
Others		...	

Veterinary Paraprofessionals

	Public administration	Both	Private accredited practitioners
Animal health activities		74	
'Community Animal Health workers'		0	
Involved in food hygiene, including the abattoirs		17	
Others		...	

8. National reference laboratories

Name of Laboratory	Contacts	Latitude	Longitude
Laboratorio de Bacteriología	Doctor Barquero Calvo Elías	9.9787	-84.1286
Laboratorio de Patología Apícola de la Escuela de Medicina Veterinaria de la Universidad Nacional	Doctor Calderón Fallas Rafael	10.01	-84.07
Laboratorio de Patología de la Escuela de Medicina Veterinaria de la UNA	Doctor Morales Acuña Juan Alberto	9.9787	-84.1286
Laboratorio de Virología, Escuela de Medicina Veterinaria, UNA	Doctor Jiménez Sánchez Carlos	9.9787	-84.1286
Laboratorio Nacional de Servicios Veterinarios	Doctora Ureña Brenes Marieta	9.97362	-84.1208

9. Diagnostic Tests

Name of Laboratory	Disease:	Test Type
Laboratorio de Patología Apícola de la Escuela de Medicina Veterinaria de la Universidad Nacional	American foulbrood of honey bees	Agar-gel Immunodiffusion (AGID)
		Pathogenic Agent Isolation On Culture
	European foulbrood of honey bees	Pathogenic Agent Isolation On Culture
		Agar-gel Immunodiffusion (AGID)
Laboratorio Nacional de Servicios Veterinarios	Avian infectious bronchitis	Enzyme-linked Immunosorbent Assay (ELISA)
	Avian infectious laryngotracheitis	Enzyme-linked Immunosorbent Assay (ELISA)
		Agar-gel Immunodiffusion (AGID)
		Polymerase Chain Reaction (PCR)
	Avian mycoplasmosis (M. gallisepticum)	Enzyme-linked Immunosorbent Assay (ELISA)
	Bovine brucellosis	Competitive ELISA (c-ELISA)
		Rose Bengal Test (RBT)
	Bovine tuberculosis	Tuberculin Test
	Classical swine fever	Antigen (Ag) Detection ELISA
		Polymerase Chain Reaction (PCR)
		Antibody Detection ELISA
	Enzootic bovine leukosis	Enzyme-linked Immunosorbent Assay (ELISA)
	Equine infectious anaemia	Coggin's Test
	Highly pathogenic avian influenza	Agar-gel Immunodiffusion (AGID)
		Enzyme-linked Immunosorbent Assay (ELISA)
		Polymerase Chain Reaction (PCR)
		Pathogen Isolation By Egg Inoculation
	Infectious bovine rhinotracheitis/infectious pustular vulvovaginitis	Enzyme-linked Immunosorbent Assay (ELISA)
	Infectious hypodermal and haematopoietic necrosis	Polymerase Chain Reaction (PCR)
	Leptospirosis	Microscopic Agglutination Test (MAT)
	New world screwworm (Cochliomyia hominivorax)	Entomological Investigations
	Newcastle disease	Pathogen Isolation By Egg Inoculation
		Haemagglutination Inhibition Test (HIT)
	Rabies	Direct Immunofluorescence (DIF) Test
	Taura syndrome	Polymerase Chain Reaction (PCR)
	White spot disease	Polymerase Chain Reaction (PCR)
Laboratorio de Virología, Escuela de Medicina Veterinaria, UNA	Avian infectious laryngotracheitis	Polymerase Chain Reaction (PCR)
Laboratorio de Patología de la Escuela de Medicina Veterinaria de la UNA	Bovine spongiform encephalopathy	Histopathological Examination

10. Vaccine Manufacturers

No information available
11. Vaccines
No information available
12. Vaccine production
No information available

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Annex 5-2. Kyrgyzstan

ANNUAL REPORT ON THE NOTIFICATION OF THE ABSENCE OR PRESENCE OF ALL DISEASES		
OIE Reference: 613, 36154, 36163, 36353	Report period: Jan - Dec 2007	Country: Kyrgyz Republic

Report Summary			
Animal Type	Terrestrial and Aquatic	Date of report	28/3/2008
Submitted	Report Submitted	Report period	Jan - Dec 2007
Name of Sender of the report		Address	
Position		Telephone	
Email		Fax	
Entered by			

1. Present Diseases

Multiple species

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Foot and mouth disease	+	A O	3	3	bov	T GSu Te Qi TSu V M Qf	447 097	23	0	0	0	3 725 900	129 300
					buf	Qi T						0	
					cap	GSu T Qi TSu Te V M Qf						0	
					cml	Qi T						0	
					o/c	Qi TSu Qf V M T GSu Te						1 059 400	
					ovi	T GSu V M Qf Te Qi TSu						500	
					sui	Qi TSu M Qf T GSu Te						0	
					fau	T Qi						0	
Anthrax	+()		5	5	bov	Te * GSu Qf V M Z		5	5	0	0	1 648 800	57 000
					buf								
					cap	Te Z GSu Qf V M *						0	
					cml								
					equ	Te Z GSu Qf V * M						214 900	
					o/c	Te V M Z GSu * Qf						4 031 900	
					ovi	Z Qf Te GSu V M *						129 600	
					sui								
					fau								
Echinococcosis/hydatidosis	+()		...	...	bov	M * T GSu TSu		12 657	0	1 657	0	0	
					buf								
					cap	* T GSu TSu M						0	
					cer								
					cml								
					equ								
					o/c	T GSu M TSu *		2 400	0	2 400	0	0	
					ovi	T GSu M TSu *						0	
					sui								
					fau								
Leptospirosis	+()		...	...	bov	Te * V M GSu Qf Qi TSu Z T						86 500	
					buf								
					can								
					cap	Te Qf * V M Z T GSu TSu Qi						0	
					cer								

					equ	Te Qf * V Z T GSu TSu Qi M						35 100	
					o/c	V M TSu Z T GSu Qi Te Qf *						321 100	
					ovi	Qf Z GSu Te T Qi TSu * V M						0	
					sui	M V Qi TSu Z T GSu Te Qf *						1 700	
Rabies	+()		...	...	bov	S Qi * V M Te Qf TSu Z GSu		21	21	0	0	34 000	20 500
					buf								
					can	Qf GSu * Z V M Te S Qi TSu		66	66	0	0	566 500	400 600
					cap	S * V M Te Qf Qi TSu Z GSu						0	
					cer								
					cml								
					equ	* GSu Te V M Qf S Qi TSu Z						3 800	
					fel								
					lep								
					o/c	Qf Qi TSu Z GSu * V M Te S		5	5	0	0	25 200	18 400
					ovi	* Z GSu Te V Qf Qi TSu S M						0	
					sui								
					fau	M Qi TSu Qf S Vp * Z GSu Te		5	5	0	0	0	
Listeriosis	+()		...	...	avi								
					bov	* Qf V Te Z T GSu M S Qi TSu						0	
					buf								
					cap	* GSu Qf Te Z T V M S Qi TSu						0	
					equ								
					o/c	S Qi TSu Te Z T V M * GSu Qf						0	
					ovi	Z T GSu Qi TSu Te Qf M V * S						0	
					sui								
Blackleg	+()		...	...	bov	S Qi TSu Te * GSu Qf Z V M						699 700	
Other clostridial infections	+		...	...	avi								
					bov	V M Te S Qi * Qf Z GSu TSu						0	
					buf								
					can								
					cap	V M Te S * Qf Z GSu Qi TSu						0	
					cml								
					equ								
					lep								
					o/c	Z GSu * M Qf Qi TSu V S Te						0	
					ovi	Te V Qf * Z GSu TSu M S Qi						0	
					pis								
					sui								
					fau								

					fau								
Other pasteurelloses	+		...	...	avi								
					bov	Qf TSu V M S Qi Te * Z T GSu						0	
					buf								
					cap	TSu V M S Qi Te Qf * Z T GSu						0	
					equ								
					lep								
					o/c	Te Z T GSu Qf M V TSu * S Qi						0	
					ovi	S Qi Te * Qf TSu Z T GSu V M						0	
					sui								
					fau								
Actinomycosis	+		...	...	bov	Qi TSu Qf Te M * GSu T						0	
					cap								
					o/c								
					ovi								
					sui								
					fau								
Intestinal Salmonella infections	+		...	...	avi								
					bov	Z T GSu M V Qi TSu * S Qf Te						0	
					can								
					cap	Z T V M Te S Qi TSu * GSu Qf						0	
					equ	V M Te S Qi Z T GSu * TSu Qf						0	
					o/c	* GSu Z T S Qi TSu Qf Te V M						0	
					ovi	V M Te S Z T GSu * Qi TSu Qf						0	
					sui	* Z T GSu Qf S Qi TSu Te V M						0	
Coccidiosis	+		...	...	avi								
					bov	GSu M TSu Te Qf						0	
					buf								
					can	TSu GSu Te Qf M						0	
					cap	M GSu TSu Te Qf						0	
					cml								
					equ								
					lep								
					o/c	GSu Te M Qf TSu						0	
					ovi	M Te Qf GSu TSu						0	
					sui	GSu M Qf TSu Te						0	
					fau								
Distomatosis (liver fluke)	+		...	...	avi								
					bov	M Qf TSu Te Qi Sp T GSu *						0	
					buf								
					can								
					cap	Qf M TSu Te Qi Sp T GSu *						0	
					cml								
					equ								

					o/c	* T GSu Te M Qf Qi Sp TSu						0	
					ovi	TSu M Te Qi Sp Qf * T GSu						0	
					fau								
Enterotoxaemia	+		...	...	bov								
					cap	* T GSu Te M Qf Qi TSu Sp						0	
					cml								
					o/c	T GSu Qi TSu Sp M * Te Qf						0	
					ovi	Te T GSu Qf M TSu Qi Sp *						0	
					fau								
Brucellosis (Brucella abortus)	+		...	...	bov	Te Z GSu Qf TSu S Qi Vp * M		4 420	0	0	4 420	0	
					buf								
					cml								
					fau								
Brucellosis (Brucella melitensis)	+()		...	...	cap	Z GSu M Te Qf TSu S Qi V *						0	
					o/c	S Qi * M V Te Qf Z GSu TSu		4 152	0	0	4 152	3 673 500	
					ovi	V M Qf TSu S Qi * Te Z GSu						0	
Brucellosis (Brucella suis)	+()		...	...	sui	S Qi TSu Te M Qf Z GSu *						0	
					fau								
Cattle													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Enzootic bovine leukosis	+()		...	...	bov	M GSu TSu Te Qf S						0	
Warble infestation	+()		...	...	bov	Te T GSu Qf M TSu Qi Sp *						0	
					fau								
Sheep/Goats													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Ovine epididymitis (B. ovis)	+()		...	...	ovi	Qf M * Z GSu TSu S Qi Te						0	
Enzootic abortion (chlamydiosis)	+()		...	...	cap	TSu Qf GSu Te * S Qi M						0	
					o/c	Te S M Qi TSu GSu Qf *						0	
					ovi	S Qi TSu Qf GSu Te * M						0	
Contagious pustular dermatitis	+		...	...	buf								
					cap	Te Qf T GSu M TSu Qi Sp *						0	
					cml								
					o/c	M * Qi Sp T GSu Te Qf TSu						0	
					ovi	Qf M T Te Qi Sp TSu * GSu						0	
					fau								
Foot-rot	+()		...	...	bov	* T GSu Te Qi Sp TSu Qf M						0	
					cap								
					o/c								
					ovi								

Sheep mange	+		...	...	cap	GSu Te * Qi Sp TSu Qf M T						0	
					cml								
					o/c	Qi Sp T Qf TSu Te M GSu *						0	
					ovi	T * GSu Qi Sp TSu Qf Te M						0	

Swine

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Porcine cysticercosis	+		...	...	sui	M TSu Qf Te GSu						0	
Swine erysipelas	+		...	...	sui	V M * Qi Sp Qf TSu T GSu Te						42 300	

Equidae

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Dourine	+()		...	...	equ	S Qi Qf TSu Te Z GSu * M						0	

Lagomorphs

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Rabbit haemorrhagic disease	+		...	...	lep	GSu Te M TSu Qf						0	
					fau								

Birds

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Avian spirochaetosis	+		...	...	avi	M Qi Sp Te * T GSu Qf TSu						0	

Bees

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Varroosis of honey bees	+()		...	...	api	* M T GSu Te TSu Qf						0	

2. Absent Diseases

Multiple species

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Vesicular stomatitis	0000	bov	GSu Te M Qf TSu	0
		buf		
		cap		
		cml		
		equ		
		o/c		
		ovi		
		sui		
		fau		
Rinderpest	0000	bov	Qf Te M TSu GSu	0
		buf		
		cap		
		o/c		
		ovi		
		fau		
Rift Valley fever	0000	bov	GSu TSu Te M Qf	0
		buf		
		cap		
		cml		
		o/c		
		ovi		
		fau		
Bluetongue	0000	bov		
		buf		
		cap		
		cml		
		o/c		

		ovi	M Qf GSu TSu Te	0
		fau		
Aujeszky's disease	-	bov		
		can		
		cap		
		o/c		
		ovi		
		sui	V M Te GSu Qf TSu	12 000
		fau		
Heartwater	-	bov	M Te GSu Qf TSu	0
		buf		
		cap		
		o/c		
		ovi		
		fau		
Q fever	0000	bov	M Te TSu Qf GSu	0
		buf		
		cap		
		o/c		
		ovi		
		fau		
Paratuberculosis	-	bov	M TSu GSu Te Qf	0
		buf		
		cap		
		o/c		
		ovi		
N. w. screwworm (C. hominivorax)	0000	avi		
		bov	M Te TSu GSu Qf	0
		buf		
		can		
		cap		
		cml		
		equ		
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		
O. w. screwworm (C. bezziana)	0000	avi		
		bov	GSu TSu M Te Qf	0
		buf		
		can		
		cap		
		cml		
		equ		
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		
Trichinellosis	-	equ		
		sui	GSu Qf M TSu Te	0
		fau		
Tularemia	-	lep	TSu Qf Te M GSu	0
		fau		
Toxoplasmosis	-	bov	Te M Qf GSu TSu	0
		buf		
		can		
		cap		
		fel		
		o/c		
		ovi		
		sui		
		fau		

Botulism	-	avi		
		bov	M Te GSu TSu Qf	0
		cap	M Te GSu TSu Qf	0
		equ		
		o/c	GSu Qf M TSu Te	0
		ovi	Te Qf M GSu TSu	0
		sui		
		fau		
Filariosis	-	bov	Qf M Te TSu GSu	0
		can		
		equ		
		fel		
		ovi		
		sui		
		fau		
Salmonellosis (S. abortusequi)	-	equ		
Cattle				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Contagious bov. pleuropneumonia	0000	bov	Qf Te GSu M TSu	0
		buf		
		cap		
		o/c		
		ovi		
Lumpy skin disease	0000	bov	Qf GSu TSu Te M	0
		buf		
		fau		
Bovine anaplasmosis	-	bov	GSu TSu M Te Qf	0
		buf		
		fau		
Bovine babesiosis	-	bov	GSu Qf M Te TSu	0
		buf		
		fau		
Bov. genital campylobacteriosis	-	bov	M Te TSu Qf GSu	0
		buf		
		ovi		
		fau		
Bovine tuberculosis	-	bov	Te M Qf TSu GSu	0
		buf		
		cap		
		cer		
		cml		
		o/c		
		ovi		
		fau		
Haemorrhagic septicaemia	-	bov	M TSu GSu Te Qf	0
		buf		
Inf.bov.rhinotracheit. (IBR/IPV)	-	bov	Qf TSu M GSu Te	0
Theileriosis	-	bov	M Qf TSu Te GSu	0
		buf		
		cap		
		o/c		
		ovi		
		fau		
Trichomonosis	-	bov	* GSu Qf M Te TSu	0
Trypanosomosis	0000	bov	Qf GSu TSu M Te	0
		buf		
		cap		
		cml		
		o/c		
		ovi		
		fau		
Bovine spongiform encephalopathy	0000	bov	TSu M Qf Te GSu	0
Mucosal disease/DVB	-	bov	GSu M Qf TSu Te	0
		buf		
Bovine viral diarrhoea	-	bov		
		buf		

Sheep/Goats				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Peste des petits ruminants	0000	bov		
		cap	M Qf TSu Te GSu	0
		o/c	GSu Te M TSu Qf	0
		ovi	Te TSu Qf M GSu	0
		sui		
		fau		
Sheep pox and goat pox	-	cap	GSu Te V M Qf Qi TSu	0
		o/c	Qi TSu V M GSu Te Qf	1 300 000
		ovi	GSu M Te Qf V Qi TSu	0
		fau		
Caprine arthritis/encephalitis	-	cap	TSu Qf Te M GSu	0
Contagious agalactia	-	cap	Qf M GSu Te TSu	0
		o/c	M Te GSu TSu Qf	0
		ovi	Qf TSu Te M GSu	0
Contagious cap. pleuropneumonia	-	cap	M Qf GSu Te TSu	0
Nairobi sheep disease	0000	cap	Qf TSu M Te GSu	0
		o/c	Te GSu Qf M TSu	0
		ovi	TSu Te Qf GSu M	0
Salmonellosis (S. abortusovis)	-	ovi	TSu Te GSu Qf M	0
Scrapie	0000	cap	GSu TSu M Qf Te	0
		o/c	Te Qf M TSu GSu	0
		ovi	M TSu Qf GSu Te	0
Maedi-visna	-	ovi	M Te GSu Qf TSu	0
Contagious ophthalmia	-	cap		
		o/c		
		ovi	GSu M Qf TSu Te	0
		fau		
Caseous lymphadenitis	-	cap		
		o/c		
		ovi	Te GSu M Qf TSu	0
		fau		
Swine				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Swine vesicular disease	0000	sui	M Te TSu Qf GSu	0
		fau		
African swine fever	0000	sui	M Qf TSu Te GSu	0
		fau		
Classical swine fever	1991	sui	GSu TSu M Te Qf V	8 400
		fau		
Transmissible gastroenteritis	2006	sui	M Te GSu Qf TSu	0
Porcine reproductive/respiratory syndr.	-	sui	Qf GSu Te TSu M	0
Melioidosis	-	bov		
		buf		
		cap		
		equ		
		lep		
		o/c		
		ovi	GSu Qf TSu Te M	0
		sui		
		fau		
Vibrionic dysentery	-	bov	GSu M Qf TSu Te	0
		equ		
		sui		
		fau		
Equidae				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
African horse sickness	0000	equ	GSu M Te Qf TSu	0
		fau		
Contagious equine metritis	-	equ	Qf TSu GSu M Te	0
Equine infectious anaemia	-	equ	TSu GSu Te Qf M	0
Equine influenza	-	equ	GSu Qf TSu Te M *	0
Equine piroplasmosis	-	equ	GSu Qf Te M TSu	0
Equine rhinopneumonitis	-	equ	Te Qf GSu TSu M	0
Glanders	-	equ	Te M Qf GSu TSu	0

Equine viral arteritis	-	equ	M GSu Qf TSu Te	0
Surra (Trypanosoma evansi)	0000	bov		
		buf		
		cml		
		equ	M Qf Te TSu GSu	0
Venezuelan equ.encephalomyelitis	0000	equ	TSu Qf M Te GSu	0
Equine coital exanthema	-	equ	TSu GSu Te M Qf	0
Ulcerative lymphangitis	-	equ	M Te GSu TSu Qf	0
Strangles	-	equ	M Sp * Te T GSu Qi TSu Qf	0
Encephalomyelitis (East.)	0000	equ	Te GSu Qf M TSu	0
Encephalomyelitis (West.)	0000	equ	TSu Qf GSu Te M	0
Lagomorphs				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Myxomatosis	-	lep	M TSu GSu Te Qf	0
		fau		
Birds				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Highly path. avian influenza	-	avi	GSu M TSu Qf Te	0
		fau	Cr	0
Newcastle disease	1986	avi	GSu TSu Te V M Qf	4 234 000
		fau		
Avian infectious bronchitis	-	avi	M Te TSu GSu Qf	0
Avian infect. laryngotracheitis	-	avi	Te M GSu TSu Qf	0
Duck virus hepatitis	-	avi	GSu Qf Te TSu M	0
Fowl cholera	-	avi	M TSu GSu Qf Te	0
		fau		
Fowl typhoid	-	avi	M Te GSu Qf TSu	0
Infec bursal disease (Gumboro)	-	avi	Te TSu M Qf GSu	0
Marek's disease	-	avi	Te TSu M GSu Qf	0
Mycoplasmosis (M. gallisepticum)	-	avi	Te M TSu Qf GSu	0
		fau		
Avian chlamydiosis	-	avi	Te M GSu Qf TSu	0
Pullorum disease	-	avi	Qf M Te TSu GSu	0
Infectious coryza	-	avi		
Avian encephalomyelitis	-	avi	TSu M Te Qf GSu	0
Other avian salmonellosis	-	avi	M TSu Te GSu Qf	0
Avian leukosis	-	avi	Qf M TSu Te GSu	0
Bees				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Acarapisosis of honey bees	-	api	TSu M Qf GSu Te	0
American foulbrood of honey bees	-	api	Qf TSu GSu Te M	0
European foulbrood of honey bees	-	api	M Qf TSu GSu Te	0
Tropilaelaps infestation of honey bees	-	api	GSu Te Qf TSu M	0
Other				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Leishmaniosis	0000	can	TSu Qf M GSu Te	0
Fish				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Viral haemorrhagic septicaemia	-	pis		
		fau		
Spring viraemia of carp	-	pis		
		fau		
Infect. haematopoietic necrosis	-	pis		
		fau		
Epizoot. haematopoietic necrosis	-	pis		
		fau		
Infectious salmon anaemia	-	pis		
		fau		
Epizootic ulcerative syndrome	-	pis		
		fau		
Gyrodactylosis (Gyrodactylus salaris)	-	pis		
		fau		
Red sea bream iridoviral disease	-	pis		
		fau		
Molluscs				

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Infection with Bonamia ostreae	0000	mol		
		fau		
Infection with Bonamia exitiosa	0000	mol		
		fau		
Infection with Marteilia refringens	0000	mol		
		fau		
Infection with Perkinsus marinus	0000	mol		
		fau		

Crustaceans

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Taura syndrome	0000	cru		
		fau		
White spot disease	0000	cru		
		fau		
Yellow head disease	0000	cru		
		fau		
Spherical baculovirosis (Penaeus monodon-type baculovirus)	0000	cru		
		fau		
Tetrahedral baculovirosis (Baculovirus penaei)	0000	cru		
		fau		
Infectious hypodermal and haematopoietic necrosis	0000	cru		
		fau		
Crayfish plague (Aphanomyces astaci)	0000	cru		
		fau		

3. Detailed quantitative information for OIE-listed diseases/infections present in Kyrgyzstan

Disease information by State by month from Report Year 2007

Foot and mouth disease

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
May	BATKEN	A	1	1	bov	446 048	17	0	0	0	57 100
Jun	BATKEN	A	0	1	bov	0					
	CHUY	O	1	1	bov	59	3	0	0	0	72 200
Jul	BATKEN	A	0	1	bov	0					
	CHUY	O	1	2	bov	990	3	0	0	0	0
Aug	BATKEN	A	0	1	bov	0					
	CHUY	O	0	2	bov	0					
Sep	BATKEN	A	0	1	bov	0					
	CHUY	O	0	2	bov	0					
Oct	BATKEN	A	0	1	bov	0					
	CHUY	O	0	2	bov	0					
Nov	BATKEN	A	0	1	bov	0					
	CHUY	O	0	2	bov	0					
Dec	BATKEN	A	0	1	bov	0					
	CHUY	O	0	2	bov	0					

Disease information for Report Year 2007

Foot and mouth disease

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		0	0		0					
Feb		0	0		0					
Mar		0	0		0					
Apr		0	0		0					

Anthrax

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		2	2	bov		2	2	0	0	28 000
Feb		3	3	bov		3	3	0	0	29 000

Echinococcosis/hydatidosis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		...	...	bov		800	0	800	0	
				o/c		1 200	0	1 200	0	
Feb		...	...	bov		11 857	0	857	0	
				o/c		1 200	0	1 200	0	

Rabies

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		...	...	bov		10	10	0	0	10 500
				can		33	33	0	0	200 300
				fau		3	3	0	0	
				o/c		2	2	0	0	9 200
Feb		...	...	bov		11	11	0	0	10 000
				can		33	33	0	0	200 300
				fau		2	2	0	0	
				o/c		3	3	0	0	9 200

Brucellosis (Brucella abortus)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		...	...	bov		2 210	0	0	2 210	
Feb		...	...	bov		2 210	0	0	2 210	

Brucellosis (Brucella melitensis)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		...	...	o/c		2 100	0	0	2 100	
Feb		...	...	o/c		2 052	0	0	2 052	

4. Unreported Diseases		
Multiple species		
Japanese encephalitis	Brucellosis	Salmonellosis
Crimean Congo haemorrhagic fever	West Nile Fever	
Cattle		
Bovine brucellosis	Bovine cysticercosis	Dermatophilosis
Sheep/Goats		
Ovine pulmonary adenomatosis		
Swine		
Atrophic rhinitis of swine	Enterovirus encephalomyelitis	Nipah virus encephalitis
Equidae		
Epizootic lymphangitis	Horse pox	Horse mange
Birds		
Avian tuberculosis	Duck virus enteritis	Fowl pox
Turkey rhinotracheitis	Avian mycoplasmosis (M.synoviae)	Low pathogenic avian influenza (poultry)
Bees		
Small hive beetle infestation		
Other		
Camelpox		
Fish		
Koi herpesvirus disease		
Molluscs		
Abalone viral mortality		

5. Zoonoses in Humans

Disease Name	Present diseases	Cases	Deaths
Anthrax	+	25	
Avian chlamydiosis	...	...	
Botulism	+	30	2
Bovine cysticercosis	...	...	
Bovine tuberculosis	...	...	
Brucellosis	+	4 035	0
Campylobacteriosis	...	...	
Crimean Congo haemorrhagic fever	...	...	
Ebola haemorrhagic fever	...	...	
Echinococcosis/hydatidosis	+	695	1
Escherichia coli O157	...	...	
Glanders	...	...	
Hantavirus pulmonary syndrome	...	...	
Highly pathogenic avian influenza	...	...	
Japanese encephalitis	...	...	
Leishmaniosis	...	...	
Leptospirosis	...	...	
Listeriosis	...	...	
Marburg haemorrhagic fever	...	...	
Monkey pox	...	...	
New variant Creutzfeldt-Jakob disease	...	...	

New world screwworm (Cochliomyia hominivorax)	...	...	
Nipah virus encephalitis	...	...	
Old world screwworm (Chrysomya bezziana)	...	...	
Porcine cysticercosis	...	...	
Q fever	...	...	
Rabies	+	4	4
Rift Valley fever	...	...	
Salmonellosis	+	698	3
Swine erysipelas	...	...	
Toxoplasmosis	...	...	
Trichinellosis	...	...	
Tularemia	...	...	
Venezuelan equine encephalomyelitis	...	...	
West Nile Fever	...	...	

6. Animal population

Species	Administrative region	Totals	Units	Number	Units
Bees	Whole country	80 124	Apiaries	18 453	Animals
Birds	Whole country	4 589 190	Establishments	1 504 425	Animals
Camelidae	Whole country	338	Establishments	206	Animals
Cattle	Whole country	1 168 026	Establishments	575 465	Animals
Fish	Whole country	65	Establishments	6	Tonnes
Goats	Whole country	554 242	Establishments	...	Animals
Hares / rabbits	Whole country	32 316	Establishments	6 054	Animals
Sheep	Whole country	3 773 619	Establishments	480 270	Animals
Sheep / goats	Whole country	4 251 813	Establishments	2 397 879	Animals
Swine	Whole country	74 918	Establishments	16 972	Animals

7. Personnel

Veterinarians:

No information available

Veterinary Paraprofessionals

No information available

8. National reference laboratories

Name of Laboratory	Contacts	Latitude	Longitude
Rpublican Ceter of Veterinary Diagnostic	Mr Marat Sydygaliev	42.815	74.4438
Veterinary diagnostic national centre	...	42.8	74.63

9. Diagnostic Tests

Name of Laboratory	Disease:	Test Type
Veterinary diagnostic national centre	American foulbrood of honey bees	Anatomo-pathological Examination
		Optical Microscopy
	Anthrax	Agar-gel Precipitation (AGP) Test
	Avian chlamydiosis	Complement Fixation Test (CFT)
	Avian infectious laryngotracheitis	Haemagglutination (HA) Test
		Haemagglutination Inhibition Test (HIT)
	Bovine babesiosis	Optical Microscopy
	Bovine tuberculosis	Anatomo-pathological Examination
	Brucellosis (Brucella abortus)	Anatomo-pathological Examination
		Rose Bengal Test (RBT)
		Rapid Serum Agglutination (RSA)
		Complement Fixation Test (CFT)
		Agar-gel Precipitation (AGP) Test
	Brucellosis (Brucella melitensis)	Rose Bengal Test (RBT)
		Rapid Serum Agglutination (RSA)
		Complement Fixation Test (CFT)
		Agar-gel Immunodiffusion (AGID)
		Anatomo-pathological Examination
	Brucellosis (Brucella suis)	Anatomo-pathological Examination
		Rose Bengal Test (RBT)
		Rapid Serum Agglutination (RSA)
		Agar-gel Immunodiffusion (AGID)
		Complement Fixation Test (CFT)
	Dourine	Complement Fixation Test (CFT)
		Optical Microscopy
	Enzootic bovine leukosis	Histological Test
	Equine piroplasmosis	Optical Microscopy
	European foulbrood of honey bees	Anatomo-pathological Examination

		Optical Microscopy
	Foot and mouth disease	Complement Fixation Test (CFT)
		Enzyme-linked Immunosorbent Assay (ELISA)
	Glanders	Complement Fixation Test (CFT)
		Anatomo-pathological Examination
	Highly pathogenic avian influenza	Haemagglutination (HA) Test
		Haemagglutination Inhibition Test (HIT)
		Enzyme-linked Immunosorbent Assay (ELISA)
	Leishmaniosis	Optical Microscopy
	Leptospirosis	Optical Microscopy
	Newcastle disease	Haemagglutination (HA) Test
		Haemagglutination Inhibition Test (HIT)
	Ovine epididymitis (Brucella ovis)	Complement Fixation Test (CFT)
	Paratuberculosis	Anatomo-pathological Examination
	Rabies	Indirect Fluorescent Antibody (IFA) Test
		Pathogenic Agent Isolation On Culture
	Salmonellosis (S. abortusovis)	Anatomo-pathological Examination
		Rapid Serum Agglutination (RSA)
	Sheep pox and goat pox	Electron Microscopy
		Enzyme-linked Immunosorbent Assay (ELISA)
	Theileriosis	Optical Microscopy
	Trichomonosis	Optical Microscopy
	Tropilaelaps infestation of honey bees	Optical Microscopy
	Varroosis of honey bees	Optical Microscopy

10. Vaccine Manufacturers

Manufacturer	Contacts	Year of start of activity	Year of cessation of activity
Biofabrik Altin-Tamir	Mr Tynchtykbek Japaraliev	...	...

11. Vaccines

Disease:	Vaccine type	Vaccine	Manufacturer	Year of start of production	Year of end of production (if production ended)
Foot and mouth disease	Live Attenuated Vaccine	FMD	Biofabrik Altin-Tamir	...	...
Rabies	Inactivated Vaccine	Rabies	Biofabrik Altin-Tamir	...	...

12. Vaccine production

No information available

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Annex 5-3. Mongolia

WAHID Interface Animal Health Information Information zoosanitaire Información Zoosanitaria

OIE Home Page Language: English

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ANNUAL REPORT ON THE NOTIFICATION OF THE ABSENCE OR PRESENCE OF ALL DISEASES		
OIE Reference: 714, 51031, 51531	Report period: Jan - Dec 2007	Country: Mongolia, Mongolian People's Republic

Report Summary			
Animal Type	Terrestrial and Aquatic	Date of report	10/11/2008
Submitted	Report Submitted	Report period	Jan - Dec 2007
Name of Sender of the report	Doloojin Orgil	Address	Enkh-Taivan Avenue 16a ULAN BATOR
Position	Director	Telephone	(976-11) 262 469
Email	vetsermongolia@magicnet.mn	Fax	(976-11) 458 933 / 452 554
Entered by	Doloojin Orgil (MNG)		

1. Present Diseases

Multiple species

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Bluetongue	?		...	...	bov	Te						0	
					buf								
					cap								
					cml								
					o/c	Te						0	
					ovi								
					fau								
Anthrax	+		23	23	bov	V *		38	30			1 592	
					buf								
					cap	V *		8	8			0	
					cml	* V						0	
					equ	*						0	
					o/c	V *						2 102	
					ovi	* V						0	
					sui	V *						0	
					fau								
Echinococcosis/hydatidosis	+		...	...	bov								
					buf								
					cap								
					cer								
					cml								
					equ								
					o/c								
					ovi								
					sui								
					fau								
Leptospirosis	+		...	...	bov								
					buf								
					can								
					cap								
					cer								
					equ								
					o/c								
					ovi								
					sui								
Rabies	+		23	23	bov	V *		22	17	5	0	0	
					buf								
					can	V *		2	2	0	0	99	
					cap	*		6	2	4	0	0	
					cer	*						0	
					cml	*		3	1	0	0	0	
					equ	V *		11	11	0	0	0	
					fel	*						0	
					lep								

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
					o/c	V *						0	
					ovi	*		2	0	2	0	0	
					sui	*						0	
					fau	*						0	
Paratuberculosis	?		...	...	bov								
					buf								
					cap								
					o/c								
					ovi								
Trichinellosis	?		...	...	equ	TSu						0	
					sui	TSu						0	
					fau								
Brucellosis (Brucella abortus)	+		...	...	bov	GSu V Te * TSu Sp						565	
					buf								
					cml	* Te						0	
					fau								
Brucellosis (Brucella melitensis)	+		...	...	cap								
					o/c	V Te TSu * Sp GSu						3 201	
					ovi								
Cattle													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Bovine tuberculosis	+?		...	...	bov	* Te Sp						0	
					buf								
					cap								
					cer								
					cml								
					o/c								
					ovi								
					fau								
Sheep/Goats													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Sheep pox and goat pox	+		0	4	cap	Z Qi Sp * V						0	
					o/c	Qi Z						0	
					ovi	* Z V Qi Sp	0					0	
					fau	Z Qi						0	
Contagious agalactia	+		79	79	cap	*		1 611	17			0	
					o/c			534					
					ovi	*		4				0	
Equidae													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Dourine	+		...	...	equ								
Equine infectious anaemia	+		...	...	equ	TSu *						0	
Equine influenza	+		...	...	equ	Te V Z *						0	
Glanders	+		...	...	equ	Te Sp *						0	

2. Absent Diseases

Multiple species

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Foot and mouth disease	2005	bov	* Sp TSu GSu Te Qf M	0
		buf	*	0
		cap	GSu Sp Qf * M	0
		cml	TSu Sp GSu M Qf *	0
		o/c	Sp TSu * M Te Qf GSu	0
		ovi	GSu M Qf Sp *	0
		sui	Sp Qf * GSu	0
		fau	Sp * GSu M Qf	0
Vesicular stomatitis	0000	bov		
		buf		
		cap		
		cml		

		equ		
		o/c		
		ovi		
		sui		
		fau		
Rinderpest	1992	bov	TSu *	0
		buf		
		cap	*	0
		o/c	*	0
		ovi	*	0
		fau	*	0
Rift Valley fever	0000	bov		
		buf		
		cap		
		cml		
		o/c		
		ovi		
		fau		
Cattle				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Contagious bov. pleuropneumonia	1973	bov	* GSu	0
		buf		
		cap	* GSu	0
		o/c	* GSu	0
		ovi	* GSu	0
Bovine spongiform encephalopathy	0000	bov	* GSu Qf	0
Sheep/Goats				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Peste des petits ruminants	0000	bov		
		cap	M GSu *	0
		o/c		
		ovi	M GSu *	0
		sui		
		fau		
Ovine epididymitis (B. ovis)	-	ovi		
Contagious cap. pleuropneumonia	1960	cap		
Swine				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Classical swine fever	2003	sui	* GSu	0
		fau		
Equidae				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
African horse sickness	0000	equ		
		fau		
Surra (Trypanosoma evansi)	0000	bov		
		buf		
		cml		
		equ		
Venezuelan equ.encephalomyelitis	0000	equ		
Birds				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Highly path. avian influenza	2006	avi	V M * TSu	372 932
		fau	* M TSu	0
Newcastle disease	-	avi		
		fau		
Other				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Leishmaniosis	0000	can		

3. Detailed quantitative information for OIE-listed diseases/infections present in Mongolia

Disease information by State by month from Report Year 2007

Sheep pox and goat pox

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated

Jan	KHENTII		...	2	ovi						
	SUKHBAATAR		...	2	ovi						
Feb	KHENTII		0	2	ovi	0					
	SUKHBAATAR		0	2	ovi	0					
Mar	KHENTII		0	2	ovi	0					
	SUKHBAATAR		0	2	ovi	0					
Apr	KHENTII		0	2	ovi	0					
	SUKHBAATAR		0	2	ovi	0					
May	KHENTII		0	2	ovi	0					
	SUKHBAATAR		0	2	ovi	0					
Jun	KHENTII		0	2	ovi	0					
	SUKHBAATAR		0	2	ovi	0					
Jul	KHENTII		0	1	ovi	0					
	SUKHBAATAR		0	1	ovi	0					
Aug	KHENTII		0	1	ovi	0					
	SUKHBAATAR		0	1	ovi	0					
Sep	KHENTII		0	1	ovi	0					
	SUKHBAATAR		0	1	ovi	0					
Oct	KHENTII		0	1	ovi	0					
	SUKHBAATAR		0	1	ovi	0					

Anthrax

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	BAYANKHONGOR		1	1	bov		1	1			
	BULGAN		1	1	bov		1	1			
	KHUVSGUL		1	1	bov		2	2			
Feb	BAYANKHONGOR		1	1	cap		1	1			
	DORNOD		1	1	bov		1				
	KHUVSGUL		1	1	bov		6	2			
	ZAVKHAN		1	1	bov		1	1			
Mar	BAYANKHONGOR		1	1	cap		2	2			
Apr	BULGAN		1	1	bov		1	1			
	UVS		1	1	bov		2	2			
May	BULGAN		1	1	bov		1	1			
Jul	KHENTII		2	2	bov		2	2			
	UVS		1	1	bov		3	3			
	UVURKHANGAI		1	1	bov		1	1			
Aug	BULGAN		1	1	cap		1	1			
	KHUVSGUL		1	1	bov		11	8			
					cap		2	2			
Sep	KHENTII		1	1	bov		1	1			
	KHUVSGUL		1	1	cap		2	2			
Oct	KHENTII		1	1	bov		1	1			
	KHUVSGUL		1	1	bov		1	1			
	UVS		1	1	bov		1	1			
	ZAVKHAN		1	1	bov		1	1			

Rabies

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	BULGAN		1	1	bov		3	3	0	0	
Feb	GOVI-ALTAI		1	1	cml		2			0	
	KHUVSGUL		1	1	ovi		2	0	2	0	
	ZAVKHAN		1	1	can		1	1	0	0	
Mar	GOVI-ALTAI		1	1	cml		1	1	0	0	
	UVS		3	3	bov		5	0	5	0	
Apr	UVS		1	1	equ		1	1	0	0	
May	KHUVSGUL		1	1	equ		1	1	0	0	
Jun	GOVI-ALTAI		1	1	bov		1	1	0	0	
	KHOVD		1	1	bov		2	2	0	0	
	UVS		1	1	bov		4	4	0	0	
					can		1	1	0	0	
					equ		1	1	0	0	
Aug	GOVI-ALTAI		1	1	cap		1	1	0	0	
Sep	BULGAN		1	1	bov		3	3	0	0	
	GOVI-ALTAI		1	1	cap		2	0	2	0	

	KHUVSGUL		5	5	bov		3	3	0	0	
					cap		2	0	2	0	
					equ		8	8	0	0	
Oct	UVS		1	1	cap		1	1	0	0	
Nov	TUV		1	1	bov		1	1	0	0	

Contagious agalactia

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	GOVI-ALTAI		1	1	cap		3				
Aug	BAYAN-ULGII		2	2	cap		20				
	UVURKHANGAI		3	3	o/c		92				
Sep	BAYANKHONGOR		2	2	cap		68				
					o/c		20				
	DUNDGOVI		1	1	ovi		4				
	GOVI-ALTAI		3	3	cap		76				
	UVS		22	22	cap		270	12			
	UVURKHANGAI		11	11	o/c		422				
Oct	BAYANKHONGOR		12	12	cap		719				
	BAYAN-ULGII		2	2	cap		22				
	KHOVD		12	12	cap		246	2			
Nov	UVURKHANGAI		8	8	cap		187	3			

Disease information for Report Year 2007

Sheep pox and goat pox

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Nov		0	0		0					
Dec		0	0		0					

Anthrax

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jun		0	0		0					
Nov		0	0		0					
Dec		0	0		0					

Rabies

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul		0	0		0					
Dec		0	0		0					

Contagious agalactia

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Dec		0	0		0					

Equine influenza

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul		0	0		0					
Aug		0	0		0					
Sep		0	0		0					

4. Unreported Diseases

Multiple species

Aujeszky's disease	Heartwater	Q fever
N. w. screwworm (C. hominivorax)	O. w. screwworm (C. bezziana)	Japanese encephalitis
Tularemia	Listeriosis	Toxoplasmosis
Blackleg	Botulism	Other clostridial infections
Other pasteurelloses	Actinomycosis	Intestinal Salmonella infections
Coccidiosis	Distomatosis (liver fluke)	Filariosis
Enterotoxaemia	Salmonellosis (S. abortusequi)	Brucellosis
Salmonellosis	Crimean Congo haemorrhagic fever	West Nile Fever
Brucellosis (Brucella suis)		

Cattle

Lumpy skin disease	Bovine anaplasmosis	Bovine babesiosis
Bovine brucellosis	Bov. genital campylobacteriosis	Bovine cysticercosis
Dermatophilosis	Enzootic bovine leukosis	Haemorrhagic septicaemia
Inf.bov.rhinotracheit. (IBR/IPV)	Theileriosis	Trichomonosis
Trypanosomosis	Mucosal disease/DVB	Warble infestation
Bovine viral diarrhoea		

Sheep/Goats

Caprine arthritis/encephalitis	Enzootic abortion (chlamydiosis)	Ovine pulmonary adenomatosis

Nairobi sheep disease	Salmonellosis (S. abortusovis)	Scrapie
Maedi-visna	Contagious pustular dermatitis	Foot-rot
Contagious ophthalmia	Caseous lymphadenitis	Sheep mange
Swine		
Swine vesicular disease	African swine fever	Atrophic rhinitis of swine
Porcine cysticercosis	Transmissible gastroenteritis	Enterovirus encephalomyelitis
Porcine reproductive/respiratory syndr.	Melioidosis	Vibrionic dysentery
Swine erysipelas	Nipah virus encephalitis	
Equidae		
Contagious equine metritis	Epizootic lymphangitis	Equine piroplasmosis
Equine rhinopneumonitis	Horse pox	Equine viral arteritis
Horse mange	Equine coital exanthema	Ulcerative lymphangitis
Strangles	Encephalomyelitis (East.)	Encephalomyelitis (West.)
Lagomorphs		
Myxomatosis	Rabbit haemorrhagic disease	
Birds		
Avian infectious bronchitis	Avian infect. laryngotracheitis	Avian tuberculosis
Duck virus hepatitis	Duck virus enteritis	Fowl cholera
Fowl pox	Fowl typhoid	Infec bursal disease (Gumboro)
Marek's disease	Mycoplasmosis (M. gallisepticum)	Avian chlamydiosis
Pullorum disease	Infectious coryza	Avian encephalomyelitis
Avian spirochaetosis	Other avian salmonellosis	Avian leukosis
Turkey rhinotracheitis	Avian mycoplasmosis (M.synoviae)	Low pathogenic avian influenza (poultry)
Bees		
Acarapisosis of honey bees	American foulbrood of honey bees	European foulbrood of honey bees
Varroosis of honey bees	Tropilaelaps infestation of honey bees	Small hive beetle infestation
Other		
Camelpox		
Fish		
Viral haemorrhagic septicaemia	Spring viraemia of carp	Infect. haematopoietic necrosis
Epizoot. haematopoietic necrosis	Infectious salmon anaemia	Epizootic ulcerative syndrome
Gyrodactylosis (Gyrodactylus salaris)	Red sea bream iridoviral disease	Koi herpesvirus disease
Molluscs		
Infection with Bonamia ostreae	Infection with Bonamia exitiosa	Infection with Marteilia refringens
Infection with Perkinsus marinus	Abalone viral mortality	
Crustaceans		
Taura syndrome	White spot disease	Yellow head disease
Spherical baculovirosis (Penaeus monodon-type baculovirus)	Tetrahedral baculovirosis (Baculovirus penaei)	Infectious hypodermal and haematopoietic necrosis
Crayfish plague (Aphanomyces astaci)		

5. Zoonoses in Humans

No information available

6. Animal population

No information available

7. Personnel

Veterinarians:

No information available

Veterinary Paraprofessionals

No information available

8. National reference laboratories

Name of Laboratory	Contacts	Latitude	Longitude

9. Diagnostic Tests

Name of Laboratory	Disease:	Test Type

10. Vaccine Manufacturers

No information available

11. Vaccines

No information available

12. Vaccine production

No information available

Back

Annex 5-4. Morocco

ANNUAL REPORT ON THE NOTIFICATION OF THE ABSENCE OR PRESENCE OF ALL DISEASES		
OIE Reference: 640, 26584, 37872	Report period: Jan - Dec 2007	Country: Morocco, Kingdom of

Report Summary			
Animal Type	Terrestrial and Aquatic	Date of report	18/4/2008
Submitted	Report Submitted	Report period	Jan - Dec 2007
Name of Sender of the report	Françoise Ricordel	Address	
Position		Telephone	
Email	f.ricordel@oie.Int	Fax	
Entered by	Françoise Ricordel (OIE)		

1. Present Diseases

Multiple species

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Bluetongue	+	1 4	1 076	1 076	bov								
					buf								
					cap								
					cml								
					o/c								
					ovi	* GSu Qi TSu Qf V M Cn	132 350	5 092	2 108			11 443 025	
					fau								
Anthrax	+		5	5	bov	* GSu S Qf V M	73	16	15			31 968	
					buf								
					cap	GSu * S Sp Qf V M						115 540	
					cml	Qi Sp TSu Qf GSu V *						4 095	
					equ	* Qf						0	
					o/c								
					ovi	V M GSu * S Sp Qf						247 423	
					sui	* Qf M GSu						0	
					fau								
Rabies	+		350	350	bov	* M Sp GSu TSu		119	114	0	5	0	
					buf	GSu						0	
					can	Qf * Sp TSu V M GSu		115	87	0	28	268 230	
					cap	* M Sp		7	7	0	0	0	
					cer								
					cml	TSu * Sp M GSu		5	5	0	0	0	
					equ	GSu M * Sp TSu		84	80	0	4	0	
					fel	* Qf Sp V M GSu		11	10	0	1	0	
					lep	*						0	
					o/c								
					ovi	GSu * M TSu Sp		12	12	0	0	0	
					sui	*						0	
					fau	* GSu Sp TSu		1	1	0	0	0	

Brucellosis (Brucella abortus)	+		16	16	bov	Qf Te Qi Sp * GSu V M	5 398	299	0		106	6 146	
					buf								
					cml	Qf * GSu						0	
					fau								
Cattle													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Bovine tuberculosis	+		...	...	bov	Te V M Qf Qi Sp * GSu		8 565	0	0	4 180	0	
					buf								
					cap								
					cer								
					cml								
					o/c								
					ovi								
					fau								
Sheep/Goats													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Sheep pox and goat pox	+		131	131	cap								
					o/c								
					ovi	* GSu TSu S V Qf M	21 594	932	202	0	730	14 944 498	
					fau								
Equidae													
Disease Name	**Present diseases**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Control Measures**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Routine Vaccinated**	**Ring vaccinated**
Equine piroplasmosis	+		...	...	equ								
Equine rhinopneumonitis	+		...	...	equ	Qf TSu V						0	
Equine viral arteritis	+?		...	...	equ	* Te TSu Qf						0	

2. Absent Diseases				
Multiple species				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Foot and mouth disease	1999	bov	* TSu Qf M	0
		buf		
		cap	TSu * Qf M	0
		cml	TSu Qf M *	0
		o/c		
		ovi	* M Qf TSu	0
		sui	*	0
		fau		
Vesicular stomatitis	0000	bov		
		buf		
		cap		
		cml		
		equ	* Qf	0
		o/c		
		ovi		
		sui		
		fau		
Rinderpest	0000	bov	* Qf	0
		buf		
		cap		
		o/c		
		ovi		
		fau		

Rift Valley fever	0000	bov	Qf *	0
		buf		
		cap		
		cml		
		o/c		
		ovi	Qf *	0
		fau		
Aujeszky's disease	0000	bov		
		can		
		cap		
		o/c		
		ovi		
		sui	*	0
		fau		
Q fever	0000	bov		
		buf		
		cap		
		o/c		
		ovi		
		fau		
N. w. screwworm (C. hominivorax)	0000	avi	*	0
		bov	*	0
		buf		
		can	*	0
		cap	*	0
		cml	*	0
		equ	*	0
		fel	*	0
		lep		
		o/c		
		ovi	*	0
		sui	*	0
		fau		
O. w. screwworm (C. bezziana)	0000	avi		
		bov		
		buf		
		can		
		cap		
		cml		
		equ		
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		
Japanese encephalitis	0000	equ	Qf *	0
		sui		
West Nile Fever	-	avi		
		bov		
		buf		
		can		
		cap		
		cer		
		cml		
		equ	GSu * Qf	0
		fel		
		lep		
		o/c		
		ovi		
		sui		

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
		fau		
Brucellosis (Brucella melitensis)	2005	cap	GSu Qf *	0
		o/c		
		ovi	Qf GSu *	0
Cattle				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Contagious bov. pleuropneumonia	0000	bov	* Qf	0
		buf		
		cap		
		o/c		
		ovi		
Lumpy skin disease	0000	bov	Qf *	0
		buf		
		fau		
Inf.bov.rhinotracheit. (IBR/IPV)	2006	bov	V Qf *	4 432
Trypanosomosis	0000	bov		
		buf		
		cap		
		cml		
		o/c		
		ovi		
		fau		
Bovine spongiform encephalopathy	0000	bov	M Qf Qi TSu *	0
Sheep/Goats				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Peste des petits ruminants	0000	bov		
		cap	Qf *	0
		o/c		
		ovi	* Qf	0
		sui		
		fau		
Contagious cap. pleuropneumonia	0000	cap	Qf *	0
Nairobi sheep disease	0000	cap		
		o/c		
		ovi		
Scrapie	0000	cap	Qf Qi *	0
		o/c		
		ovi	Qf Qi *	0
Maedi-visna	0000	ovi	Qi Qf *	0
Equidae				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
African horse sickness	1991	equ	Qf * GSu TSu	0
		fau		
Contagious equine metritis	0000	equ	* Qf TSu	0
Dourine	1991	equ	Qf TSu *	0
Equine infectious anaemia	-	equ	* Qf TSu	0
Equine influenza	2006	equ	V Qf TSu	0
Glanders	-	equ	Qf *	0
Venezuelan equ.encephalomyelitis	0000	equ	* Qf	0
Encephalomyelitis (East.)	0000	equ	Qf *	0
Encephalomyelitis (West.)	0000	equ	Qf *	0
Birds				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Highly path. avian influenza	1983	avi	M Qf Cr GSu S TSu *	0
		fau		
Newcastle disease	-	avi	V Qf *	0
		fau		
Low pathogenic avian influenza (poultry)	-	avi	GSu * Cr Qf	0
Other				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**

Leishmaniosis	2006	can	*	0
Camelpox	2006	cml	* V	8 000

3. Detailed quantitative information for OIE-listed diseases/infections present in Morocco

Disease information for Report Year 2007

Bluetongue

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	1	5	5	ovi	543	15	8			
Mar	1	2	2	ovi	504	14	5			
Apr	1	3	3	ovi	244	14	6			
May	1	43	43	ovi	5 875	491	219			
Jun	1	175	175	ovi	20 537	844	435			
Jul	1 4	970	970	ovi	80 244	2 037	820			
Aug	1 4	448	448	ovi	17 407	1 085	338			
Sep	1 4	236	236	ovi	4 817	433	176			
Oct	1 4	30	30	ovi	1 257	116	67			
Nov	1 4	12	12	ovi	922	43	34			
Dec		0	0		0					

Sheep pox and goat pox

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		22	22	ovi	1 918	121	65	0	56	
Feb		22	22	ovi	3 084	174	63	0	111	
Mar		27	27	ovi	3 926	147	36	0	111	
Apr		19	19	ovi	4 090	253	10	0	243	
May		8	8	ovi	1 462	34	3	0	31	
Jun		10	10	ovi	3 533	86	7	0	79	
Jul		1	1	ovi	150	7	0		7	
Aug		5	5	ovi	595	16	1		15	
Sep		3	3	ovi	890	20	7		13	
Oct		4	4	ovi	1 113	24	1		23	
Nov		9	9	ovi	693	43	9		34	
Dec		1	1	ovi	140	7	0		7	

Anthrax

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul		0	0		0					
Aug		2	2	bov	15	4	4			
Sep		1	1	bov	5	2	2			
Oct		2	2	bov	53	10	9			

Rabies

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		40	40	bov		14	14	0	0	
				can		13	12	0	1	
				cap		2	2	0	0	
				equ		9	9	0	0	
				ovi		2	2	0	0	
Feb		33	33	bov		5	4	0	1	
				can		13	8	0	5	
				cap		1	1	0	0	
				equ		11	11	0	0	
				fel		3	3	0	0	
Mar		25	25	bov		11	11	0	0	
				can		8	6		2	
				cap		1	1	0	0	
				equ		2	2	0	0	
				fel		2	2	0	0	
				ovi		1	1	0	0	
Apr		36	36	bov		14	14	0	0	
				can		11	8	0	3	
				equ		10	9	0	1	
				ovi		1	1	0	0	

May		34	34	bov		7	7	0	0	
				can		17	13	0	4	
				cap		1	1	0	0	
				equ		7	6	0	1	
				fel		2	2	0	0	
Jun		39	39	bov		15	13	0	2	
				can		13	8	0	5	
				cap		1	1	0	0	
				equ		8	8	0	0	
				fel		2	2	0	0	
Jul		40	40	bov		18	17	0	1	
				can		12	10	0	2	
				equ		8	8	0	0	
				fel		1	0	0	1	
				ovi		2	2	0	0	
Aug		11	11	bov		4	4	0	0	
				can		1	1	0	0	
				equ		6	4	0	2	
Sep		9	9	can		5	4	0	1	
				equ		4	4	0	0	
Oct		20	20	bov		4	4	0	0	
				can		8	6	0	2	
				equ		8	8	0	0	
				ovi		1	1	0	0	
Nov		41	41	bov		14	13	0	1	
				can		12	9	0	3	
				cap		1	1	0	0	
				equ		11	11	0	0	
				fau		1	1	0	0	
				ovi		2	2	0	0	
Dec		22	22	bov		13	13	0	0	
				can		2	2	0	0	
				cml		5	5	0	0	
				fel		1	1	0	0	
				ovi		3	3	0	0	

Bovine tuberculosis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		...	...	bov		424				
Feb		...	...	bov		731				
Mar		...	...	bov		836				
Apr		...	...	bov		878				
May		...	...	bov		747				
Jun		...	...	bov		769				
Jul		...	...	bov		730	0	0	730	
Aug		...	...	bov		934	0	0	934	
Sep		...	...	bov		784	0	0	784	
Oct		...	...	bov		786	0	0	786	
Nov		...	...	bov		526	0	0	526	
Dec		...	...	bov		420	0	0	420	

Brucellosis (Brucella abortus)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		0	0		0					
Mar		0	0		0					
Apr		1	1	bov	3 200	4	0		4	
May		1	1	bov	160	33	0		33	
Jun		1	2	bov	513	51	0		5	
Jul		6	6	bov	812	76	0		10	
Aug		7	7	bov	713	135	0		54	
Oct		0	0		0					

4. Unreported Diseases

Multiple species		
Echinococcosis/hydatidosis	Heartwater	Leptospirosis
Paratuberculosis	Trichinellosis	Tularemia
Listeriosis	Toxoplasmosis	Blackleg
Botulism	Other clostridial infections	Other pasteurelloses
Actinomycosis	Intestinal Salmonella infections	Coccidiosis
Distomatosis (liver fluke)	Filariosis	Enterotoxaemia
Salmonellosis (S. abortusequi)	Brucellosis	Salmonellosis
Crimean Congo haemorrhagic fever	Brucellosis (Brucella suis)	
Cattle		
Bovine anaplasmosis	Bovine babesiosis	Bovine brucellosis
Bov. genital campylobacteriosis	Bovine cysticercosis	Dermatophilosis
Enzootic bovine leukosis	Haemorrhagic septicaemia	Theileriosis
Trichomonosis	Mucosal disease/DVB	Warble infestation
Bovine viral diarrhoea		
Sheep/Goats		
Ovine epididymitis (B. ovis)	Caprine arthritis/encephalitis	Contagious agalactia
Enzootic abortion (chlamydiosis)	Ovine pulmonary adenomatosis	Salmonellosis (S. abortusovis)
Contagious pustular dermatitis	Foot-rot	Contagious ophthalmia
Caseous lymphadenitis	Sheep mange	
Swine		
Swine vesicular disease	African swine fever	Classical swine fever
Atrophic rhinitis of swine	Porcine cysticercosis	Transmissible gastroenteritis
Enterovirus encephalomyelitis	Porcine reproductive/respiratory syndr.	Melioidosis
Vibrionic dysentery	Swine erysipelas	Nipah virus encephalitis
Equidae		
Epizootic lymphangitis	Horse pox	Horse mange
Surra (Trypanosoma evansi)	Equine coital exanthema	Ulcerative lymphangitis
Strangles		
Lagomorphs		
Myxomatosis	Rabbit haemorrhagic disease	
Birds		
Avian infectious bronchitis	Avian infect. laryngotracheitis	Avian tuberculosis
Duck virus hepatitis	Duck virus enteritis	Fowl cholera
Fowl pox	Fowl typhoid	Infec bursal disease (Gumboro)
Marek's disease	Mycoplasmosis (M. gallisepticum)	Avian chlamydiosis
Pullorum disease	Infectious coryza	Avian encephalomyelitis
Avian spirochaetosis	Other avian salmonellosis	Avian leukosis
Turkey rhinotracheitis	Avian mycoplasmosis (M.synoviae)	
Bees		
Acarapisosis of honey bees	American foulbrood of honey bees	European foulbrood of honey bees
Varroosis of honey bees	Tropilaelaps infestation of honey bees	Small hive beetle infestation
Fish		
Viral haemorrhagic septicaemia	Spring viraemia of carp	Infect. haematopoietic necrosis
Epizoot. haematopoietic necrosis	Infectious salmon anaemia	Epizootic ulcerative syndrome
Gyrodactylosis (Gyrodactylus salaris)	Red sea bream iridoviral disease	Koi herpesvirus disease
Molluscs		
Infection with Bonamia ostreae	Infection with Bonamia exitiosa	Infection with Marteilia refringens
Infection with Perkinsus marinus	Abalone viral mortality	
Crustaceans		
Taura syndrome	White spot disease	Yellow head disease
Spherical baculovirosis (Penaeus monodon-type baculovirus)	Tetrahedral baculovirosis (Baculovirus penaei)	Infectious hypodermal and haematopoietic necrosis
Crayfish plague (Aphanomyces astaci)		

5. Zoonoses in Humans

Disease Name	**Present diseases**	**Cases**	**Deaths**
Anthrax	+	27	7
Avian chlamydiosis	...	...	
Botulism	+	4	1
Bovine cysticercosis	...	...	

Bovine tuberculosis	...	...	
Brucellosis	+	24	
Campylobacteriosis	...	...	
Crimean Congo haemorrhagic fever	...	...	
Ebola haemorrhagic fever	...	...	
Echinococcosis/hydatidosis	+	1 300	
Escherichia coli O157	...	...	
Glanders	...	...	
Hantavirus pulmonary syndrome	...	...	
Highly pathogenic avian influenza	...	...	
Japanese encephalitis	...	...	
Leishmaniosis	+	1 489	
Leptospirosis	+	24	
Listeriosis	+	1	
Marburg haemorrhagic fever	...	...	
Monkey pox	...	...	
New variant Creutzfeldt-Jakob disease	...	...	
New world screwworm (Cochliomyia hominivorax)	...	...	
Nipah virus encephalitis	...	...	
Old world screwworm (Chrysomya bezziana)	...	...	
Porcine cysticercosis	...	...	
Q fever	...	...	
Rabies	+	31	31
Rift Valley fever	...	...	
Salmonellosis	+	1 312	5
Swine erysipelas	...	...	
Toxoplasmosis	...	...	
Trichinellosis	...	...	
Tularemia	...	...	
Venezuelan equine encephalomyelitis	...	...	
West Nile Fever	...	...	

6. Animal population

Species	Administrative region	Totals	Units	Number	Units
Bees	Whole country	480 200	Apiaries	...	Animals
Camelidae	Whole country	172 867	Establishments	...	Animals
Cattle	Whole country	2 755 100	Establishments	...	Animals
Goats	Whole country	5 355 400	Establishments	...	Animals
Sheep	Whole country	17 259 700	Establishments	...	Animals
Sheep / goats	Whole country	22 615 100	Establishments	...	Animals

7. Personnel

Veterinarians:

	Public administration	Both	Private accredited practitioners
Animal health activities	120		541
Public Health activities (abattoirs, food hygiene, etc,)	127		0
Laboratories	44		0
Academics or Training Institutions		50	
Private practitioners in the pharmaceutical industry		40	
Independent Private Veterinarians		15	
Others (Total paraprofessionnels : 950)		...	

Veterinary Paraprofessionals

	Public administration	Both	Private accredited practitioners
Animal health activities		...	
'Community Animal Health workers'		...	
Involved in food hygiene, including the abattoirs		...	
Others		...	

8. National reference laboratories

Name of Laboratory	Contacts	Latitude	Longitude
IAV Hassan II	Indéterminé .	34	-6.8

9. Diagnostic Tests

Name of Laboratory	Disease:	Test Type

10. Vaccine Manufacturers

Manufacturer	Contacts	Year of start of activity	Year of cessation of activity
BIOPHARMA	Undetermined .	...	...

11. Vaccines

Disease:	Vaccine type	Vaccine	Manufacturer	Year of start of production	Year of end of production (if production ended)
Anthrax	Live Attenuated Vaccine	Vaccin Fièvre Charbonneuse	BIOPHARMA	...	...
Avian infectious bronchitis	Live Attenuated Vaccine	Vaccin Bronchite Infectieuse Aviaire	BIOPHARMA	...	...
Bluetongue	Live Attenuated Vaccine	Vaccin Fièvre Catarrhale Du Mouton	BIOPHARMA	...	...
Foot and mouth disease	Inactivated Vaccine	Vaccin FA	BIOPHARMA	...	...
Newcastle disease	Live Attenuated Vaccine	Vaccin Newcastle	BIOPHARMA	...	...
Rabies	Inactivated Vaccine	Vaccin Rage	BIOPHARMA	...	...
Sheep pox and goat pox	Live Attenuated Vaccine	Vaccin Clavelée Et Variole Caprine	BIOPHARMA	...	...

12. Vaccine production

Manufacturer	Vaccine	Doses produced	Doses exported
BIOPHARMA	vaccin clavelée et variole caprine	26 000 000	8 000 000
	vaccin fièvre catarrhale du mouton	18 000 000	5 000 000
	vaccin fièvre charbonneuse	500 000	100 000
	vaccin rage	350 000	0

Back

Annex 5-5. Turkey

ANNUAL REPORT ON THE NOTIFICATION OF THE ABSENCE OR PRESENCE OF ALL DISEASES		
OIE Reference: 601, 19924, 32995, 35384	Report period: Jan - Dec 2007	Country: Turkey, Republic of

Report Summary			
Animal Type	Terrestrial and Aquatic	Date of report	19/3/2008
Submitted	Report Submitted	Report period	Jan - Dec 2007
Name of Sender of the report	Muzaffer Aydemir	Address	Koruma Ve Kontrol Genel Mudurlugu Esat Caddest No 3 Bakanliklar Ankara 06100
Position	General Director	Telephone	(90-312) 425 77 89
Email	vet_service@kkgm.gov.tr	Fax	(90-312) 418 63 18
Entered by	Muzaffer Aydemir (TUR)		

1. Present Diseases

Multiple species

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Foot and mouth disease	+	A O Not typed	801	801	bov	Te Cr Z T GSu * Qi Sp TSu S V M Qf	29 937	17 923	1 000	27	703	23 963 895	248 451
					buf	S Qi Sp Te Z T GSu Cr M Qf * TSu	54	28	2	0	26	0	12 839
					cap	Cr Z T GSu S Qi Sp * M Qf Te	4 393	3 361	1 007	44	0	0	25 854
					cml	Cr S Qi Sp Te Qf * Z T						0	
					o/c	V S Qi Sp Z Te T						13 082 086	
					ovi	Qf M Cr Z T GSu * Te S Qi Sp	16 608	11 054	3 821	51	91	0	89 518
					sui	* S Qi Sp Qf Z T Te						0	
					fau	* Te T Qf Z S Qi Sp						0	
Anthrax	+		116	116	bov	Te Qi V * GSu Qf	5 213	244	219	26	0	675 943	52 718
					buf	Te Qi GSu Qf *		0	0	0	0	0	350
					cap	* Te Qi GSu Qf	546	27	27	0	0	0	5 209
					cml								
					equ	* Te Qi Qf V GSu	5	4	4	0	0	628	216
					o/c	V						575 648	
					ovi	GSu * Qf Te Qi	4 078	301	301	0	0	0	55 480
					sui								
					fau			2	2	0	0		0
Rabies	+		272	272	bov	* V GSu Qi Qf	2 543	86	71	15	0	186 858	4 731
					buf	* Qf Qi GSu						0	
					can	Qf GSu Qi V *	1 392	180	117	63	0	322 110	6 245
					cap	* GSu Qf Qi	271	2	0	2	0	0	355
					cer	* Qf GSu						0	
					cml	GSu Qf *						0	
					equ	GSu * Qf V Qi	72	5	4	1	0	678	97
					fel	GSu Qi Qf V *	164	13	12	1	0	61 197	416

					lep	GSu * Qf						0	
					o/c	V						78 877	
					ovi	GSu * Qi Qf	1 653	22	19	1	2	0	1 762
					sui	* Qf GSu						0	
					fau	V * Qf GSu	8	25	16	9	0	30	0
Brucellosis (Brucella abortus)	+		532	532	bov	Te * Qf V GSu Qi Sp	8 112	1 418	49	52	1 317	308 483	8 050
					buf	Qi Sp GSu * Qf Te						0	
					cml								
					fau								
Brucellosis (Brucella melitensis)	+		201	201	cap	Qf GSu Qi *	1 668	230	2	0	228	0	7 691
					o/c	V						3 014 489	
					ovi	* Qf Qi GSu	12 118	1 596	53	2	1 541	0	36 522

Cattle

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Bovine tuberculosis	+		312	312	bov	* Te GSu Qf Qi Sp	5 024	1 436	52	81	1 303	0	23
					buf	Qi Sp Qf *						0	
					cap								
					cer								
					cml								
					o/c								
					ovi								
					fau								

Sheep/Goats

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Peste des petits ruminants	+		95	95	bov								
					cap	Z GSu Te Qf * T Qi	1 590	1 031	451	35	0	0	13 682
					o/c	V						2 027 119	
					ovi	Z T GSu Qi * Te Qf	8 127	2 573	1 159	6	34	0	55 064
					sui								
					fau								
Sheep pox and goat pox	+		147	147	cap	* GSu Qi T Qf	156	15	2	0	0	0	6 976
					o/c	V						5 297 367	
					ovi	T GSu Qf * Qi	12 991	5 050	2 421	4	27	0	105 119
					fau								

Birds

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Highly path. avian influenza	+	H5N1	17	17	avi	Z GSu Te Qi * S Vp	23 956	387	387	23 569	0	0	0
					fau	Z GSu S Vp Te Qi *						0	
Newcastle disease	+		77	77	avi	V * TSu Te Qf S Qi Z	2 514	2 391	2 068	764	0	344 476 450	0
					fau	Z Te * S Qi Vp		31	31	0	0	0	0

Bees

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
American foulbrood of honey bees	+		14	14	api	GSu Qf Qi *	864	605	348	10	0	0	0
Varroosis of honey bees	+		80	80	api	Qi Qf *	7 264	5 624	3 721	37	0	0	0

Fish

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Viral haemorrhagic septicaemia	+		1	1	pis	*	500	500	500	0	0	0	0
					fau								

2. Absent Diseases

Multiple species

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Vesicular stomatitis	0000	bov	*	0
		buf	*	0
		cap		
		cml		
		equ		
		o/c		
		ovi		
		sui		
		fau		
Rinderpest	1996	bov	*	0
		buf	*	0
		cap		
		o/c		
		ovi		
		fau		
Rift Valley fever	0000	bov		
		buf		
		cap		
		cml		
		o/c		
		ovi		
		fau		
Bluetongue	2000	bov		
		buf		
		cap	GSu *	0
		cml		
		o/c		
		ovi	* GSu	0
		fau		
N. w. screwworm (C. hominivorax)	0000	avi		
		bov		
		buf		
		can		
		cap		
		cml		
		equ		
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		

Cattle

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Lumpy skin disease	0000	bov		
		buf		
		fau		
Bovine spongiform encephalopathy	0000	bov	* GSu	0

Swine

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated

Swine vesicular disease	0000	sui		
		fau		
African swine fever	0000	sui		
		fau		
Classical swine fever	0000	sui		
		fau		
Porcine cysticercosis	0000	sui		
Equidae				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Dourine	0000	equ	*	0
Equine infectious anaemia	2005	equ	*	0
Glanders	1998	equ	*	0
Birds				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Fowl typhoid	2005	avi	*	0
Pullorum disease	1996	avi	*	0

3. Detailed quantitative information for OIE-listed diseases/infections present in Turkey

Disease information by State by month from Report Year 2007

Foot and mouth disease

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	ADANA	O	3	3	bov	121	114	8	0	0	8 007
					ovi	20	20	0	0	0	0
	ADIYAMAN	O	3	3	bov	63	63	5	0	0	27
					ovi	145	145	24	0	0	314
	AFYON	O Not typed	4	4	bov	76	76	3	0	12	378
					ovi	49	41	41	0	0	0
	AKSARAY	O	4	4	bov	11	11	0	0	11	1 278
	AMASYA	O Not typed	3	3	bov	32	32	13	0	0	343
					ovi	200	200	170	0	0	140
	ANKARA	O	7	7	bov	5	5	1	0	0	234
					ovi	265	265	130	0	0	1 522
	ANTALYA	O	6	6	bov	50	33	0	0	0	1 534
					ovi	617	467	210	0	0	1 986
	AYDIN	Not typed	1	1	bov	140	140	14	0	0	1 453
	BITLIS	Not typed	2	2	bov	4	44	1	0	0	46
	BOLU	Not typed	2	2	bov	22	12	0	0	0	800
	BURDUR	A O	5	5	bov	33	28	0	0	0	2 849
	BURSA	A O	4	4	bov	30	30	0	0	1	1 869
					ovi	0	0	0	0	0	905
	CANKIRI	A O	5	5	bov	149	149	34	0	0	847
					ovi	80	12	12	0	0	0
	CORUM	O	1	1	bov	3	3	0	0	0	132
	DENIZLI	O Not typed	3	3	bov	59	59	0	0	0	808
					cap	80	80	20	0	0	317
					ovi	0	0	0	0	0	470
	DIYARBAKIR	Not typed	1	1	bov	10	10	0	0	0	0
	EDIRNE	A	1	1	bov	2	2	0	0	2	1 547
					ovi	0	0	0	0	0	889
	ELAZIG	O Not typed	3	3	bov	19	19	3	0	0	938
	ERZURUM	O	3	3	bov	98	98	16	0	0	404
	GAZIANTEP	O Not typed	2	2	bov	20	20	4	0	0	208
	GIRESUN	O	1	1	bov	6	6	3	0	0	540
	ICEL	O	2	2	bov	25	8	0	0	0	121
					ovi	0	0	0	0	0	34
	ISPARTA	A O Not typed	6	6	bov	81	81	3	0	0	4 365
					cap	0	0	0	0	0	30
					ovi	0	0	0	0	0	2 586
	IZMIR	O Not typed	10	10	bov	19	19	1	0	0	2 389

					cap	288	288	38	0	0	510
					ovi	110	110	23	0	0	1 777
	K. MARAS	O	4	4	bov	50	50	3	0	0	2 200
					cap	41	41	0	0	0	0
	KARAMAN	O	1	1	bov	10	10	2	0	0	408
					buf	0	0	0	0	0	1 500
					ovi	10	10	0	0	0	0
	KASTAMONU	A O Not typed	8	8	bov	67	67	10	0	0	196
	KAYSERI	O Not typed	6	6	bov	148	145	11	0	0	1 879
					ovi	0	0	0	0	0	397
	KIRSEHIR	O	1	1	bov	120	120	10	0	0	3 527
	KOCAELI	Not typed	1	1	bov	9	9	0	0	0	182
					ovi	0	0	0	0	0	30
	KONYA	O Not typed	13	13	bov	98	98	13	0	3	11 208
					buf	0	0	0	0	0	10 900
					ovi	1 131	1 131	681	0	0	320
	KUTAHYA	A O	2	2	bov	17	17	0	0	0	721
	MALATYA	A O Not typed	10	10	bov	106	106	3	0	0	3 176
					cap	0	0	0	0	0	330
	MUGLA	O	4	4	bov	38	38	1	0	0	2 348
					cap	0	0	0	0	0	86
					ovi	0	0	0	0	0	266
	MUS	O	1	1	bov	50	50	0	0	0	0
	NEVSEHIR	O	2	2	bov	14	14	0	0	0	283
	NIGDE	O Not typed	2	2	bov	16	16	1	0	0	824
	ORDU	O	2	2	bov	5	5	0	0	0	360
	OSMANIYE	O Not typed	13	13	bov	98	88	5	3	0	521
					ovi	38	38	6	0	0	0
	RIZE	O	8	8	bov	26	26	3	0	0	351
	SAKARYA	Not typed	2	2	bov	5	5	0	0	0	626
	SIRNAK	O	1	1	bov	3	3	1	0	0	452
					cap	0	0	0	0	0	205
					ovi	0	0	0	0	0	300
	SIVAS	O Not typed	4	4	bov	583	583	26	0	2	639
					ovi	0	0	0	0	0	3 250
	TOKAT	A Not typed	2	2	bov	118	118	0	0	0	2 603
	TRABZON	O	1	1	bov	1	1	0	0	0	0
	USAK	Not typed	2	2	bov	80	12	0	0	0	2 136
	YOZGAT	Not typed	2	2	bov	9	9	2	0	0	619
Feb	ADIYAMAN	O	2	2	bov	12	12	0	0	9	74
					ovi	20	20	3	0	0	0
	AFYON	O	4	4	bov	35	35	2	0	0	1 635
					ovi	125	5	4	0	0	0
	ANKARA	A O	5	5	bov	20	20	20	0	0	1 254
					ovi	763	19	16	0	0	870
	ARDAHAN	O	3	3	bov	61	41	0	0	0	3 473
	AYDIN	A O Not typed	14	14	bov	344	344	34	0	0	6 905
					ovi	0	0	0	0	0	250
	BOLU	A O Not typed	5	5	bov	18	13	0	0	0	535
	CANKIRI	O	2	2	bov	100	100	6	0	0	787
					ovi	80	80	80	0	0	0
	CORUM	O Not typed	4	4	bov	140	140	2	0	3	912
	DIYARBAKIR	O Not typed	7	7	bov	46	46	3	0	0	50
					ovi	100	100	8	0	0	200
	ERZURUM	A O Not typed	6	6	bov	439	439	22	0	0	1 580
	GAZIANTEP	O Not typed	2	2	bov	2	2	0	0	0	0
	ICEL	O	2	2	bov	8	8	0	0	0	369
					cap	385	385	98	0	0	407
					ovi	104	104	24	0	0	257
	ISPARTA	A	2	2	bov	79	79	28	0	0	600
					cap	0	0	0	0	0	105

					ovi	220	220	56	0	0	335
	IZMIR	O	1	1	bov	25	25	3	0	0	66
	K. MARAS	O Not typed	3	3	bov	120	114	7	0	0	363
					ovi	0	0	0	0	0	200
	KARABUK	O Not typed	2	2	bov	19	19	2	0	0	116
	KARAMAN	O Not typed	3	3	bov	4	4	0	0	0	156
					cap	19	19	14	0	0	800
					ovi	55	55	30	0	0	4 230
	KARS	O	1	1	bov	148	148	0	0	0	647
	KASTAMONU	A Not typed	2	2	bov	8	8	0	0	0	0
	KAYSERI	O	1	1	bov	22	22	2	0	0	300
	KIRKLARELI	O	1	1	bov	9	9	0	0	9	570
					cap	0	0	0	0	0	2 275
					ovi	0	0	0	0	0	230
	KIRSEHIR	O	4	4	bov	37	37	0	0	0	228
					cap	100	100	50	0	0	0
					ovi	190	190	115	0	0	150
	KOCAELI	O Not typed	3	3	bov	10	10	1	0	0	607
					ovi	12	12	12	0	0	0
	KONYA	O Not typed	6	6	bov	48	48	10	0	0	1 187
					ovi	60	60	60	0	0	0
	MALATYA	O Not typed	3	3	bov	21	21	4	1	0	250
	MARDIN	Not typed	1	1	bov	10	2	2	0	0	0
	MUS	O	1	1	bov	25	25	0	0	0	0
	NEVSEHIR	O	1	1	bov	3	3	0	0	0	68
	NIGDE	O Not typed	5	5	bov	20	48	0	0	0	1 510
	ORDU	O	2	2	bov	6	6	0	0	0	0
	OSMANIYE	O Not typed	3	3	bov	16	16	1	0	0	0
	SAKARYA	O Not typed	2	2	bov	45	34	2	0	0	420
	SAMSUN	Not typed	1	1	bov	4	4	0	0	0	217
	SIRNAK	O	1	1	bov	16	2	0	0	0	383
					cap	12	0	0	0	0	945
					ovi	22	0	0	0	0	1 120
	SIVAS	Not typed	2	2	bov	117	117	7	0	0	264
	TRABZON	O	1	1	bov	8	8	1	0	0	250
	TUNCELI	O	1	1	bov	6	6	0	0	0	0
	USAK	O	2	2	bov	20	20	0	1	0	1 198
Mar	ADIYAMAN	O Not typed	2	2	bov	4	4	0	0	0	115
	AFYON	A	1	1	ovi	145	5	5	0	0	430
	AGRI	O Not typed	4	4	bov	122	122	2	0	0	0
	AKSARAY	O	1	1	bov	12	12	4	0	0	0
					ovi	540	540	540	0	0	0
	AMASYA	O	2	2	bov	19	19	6	0	1	1 407
					cap	275	275	170	0	0	300
					ovi	110	110	20	0	85	725
	ANKARA	O	3	3	bov	0	0	0	0	0	204
					ovi	20	20	18	0	0	200
	ANTALYA	O	2	2	bov	5	5	0	0	0	585
					cap	15	15	0	0	0	2 600
					ovi	0	0	0	0	0	4 200
	BAYBURT	Not typed	1	1	bov	3	3	0	0	0	655
	BILECIK	O	1	1	cap	189	58	3	0	0	0
	BOLU	Not typed	2	2	bov	39	6	0	0	0	711
					ovi	0	0	0	0	0	450
	BURSA	O	1	1	bov	2	2	0	0	0	303
					ovi	0	0	0	0	0	875
	CANAKKALE	O	1	1	bov	48	22	1	0	47	729
					buf	26	0	0	0	26	0
					cap	0	0	0	0	0	527
					ovi	0	0	0	0	0	2 412
	CANKIRI	O	1	1	bov	10	10	3	0	0	146

					ovi	40	40	25	0	0	0
	CORUM	A	1	1	bov	1	1	0	0	0	175
	DENIZLI	O	1	1	bov	2	2	0	0	0	42
	DIYARBAKIR	O Not typed	4	4	bov	117	117	5	0	0	150
					ovi	0	0	0	0	0	200
	ERZINCAN	O Not typed	3	3	bov	19	19	2	0	0	1 249
	ERZURUM	O Not typed	3	3	bov	220	220	12	0	0	1 536
	ESKISEHIR	O	1	1	bov	8	8	0	0	0	920
					ovi	0	0	0	0	0	1 116
	GAZIANTEP	O	1	1	bov	2	2	0	0	0	96
	GIRESUN	O Not typed	6	6	bov	39	39	8	0	0	2 352
	GUMUSHANE	O	1	1	bov	20	4	0	0	0	0
	HATAY	Not typed	1	1	bov	4	4	0	0	0	210
	ISPARTA	O Not typed	4	4	bov	25	25	0	0	0	3 300
					cap	440	440	260	0	0	1 220
					ovi	200	200	80	0	0	3 275
	IZMIR	O	2	2	bov	21	21	0	0	0	350
					cap	385	385	18	0	0	850
					ovi	0	0	0	0	0	5 000
	K. MARAS	Not typed	2	2	bov	26	14	5	0	0	503
					cap	30	30	0	0	0	0
	KARABUK	Not typed	1	1	bov	7	7	1	0	0	71
	KARAMAN	O	1	1	bov	10	10	0	0	0	0
					ovi	12	12	10	0	0	0
	KARS	O	1	1	bov	1	1	0	0	0	717
	KAYSERI	O Not typed	6	6	bov	208	168	11	0	0	1 565
					ovi	113	113	68	0	0	0
	KIRIKKALE	O	2	2	cap	1	1	1	0	0	250
					ovi	12	12	0	0	0	0
	KONYA	O Not typed	3	3	bov	42	42	3	0	0	4 374
					ovi	252	252	222	0	0	0
	MALATYA	O Not typed	5	5	bov	56	56	2	0	0	3 535
					cap	462	462	184	0	0	330
					ovi	125	125	40	0	0	467
	NEVSEHIR	O	2	2	bov	30	30	0	0	0	352
	NIGDE	O	1	1	bov	15	4	0	0	0	57
	ORDU	O Not typed	6	6	bov	64	49	8	0	0	1 739
					ovi	0	0	0	0	0	150
	OSMANIYE	O	2	2	bov	2	2	0	0	0	17
	SAMSUN	Not typed	1	1	bov	3	3	1	0	0	200
	SANLIURFA	O	1	1	bov	7	7	1	0	0	105
					ovi	0	0	0	0	0	150
	SIRNAK	O	5	5	bov	49	49	11	10	0	804
					cap	84	84	32	18	0	1 690
					ovi	155	155	43	25	0	6 030
	SIVAS	O	1	1	bov	0	0	0	0	0	450
					ovi	80	80	80	0	0	558
	TRABZON	Not typed	2	2	bov	16	9	0	0	5	875
	USAK	A O Not typed	3	3	bov	41	23	0	0	0	4 257
	YALOVA	Not typed	1	1	bov	4	4	0	0	0	0
	YOZGAT	O Not typed	5	5	bov	71	71	0	0	0	1 157
					cap	0	0	0	0	0	50
					ovi	85	85	85	0	0	1 800
Apr	ADIYAMAN	O	2	2	bov	170	170	8	0	0	260
					cap	50	50	3	0	0	0
					ovi	360	360	9	0	0	850
	AFYON	O Not typed	3	3	bov	23	13	0	0	0	2 095
					ovi	194	42	12	0	0	0
	AKSARAY	O	3	3	bov	15	15	0	0	0	143
					ovi	200	100	30	0	0	0
	AMASYA	O Not typed	5	5	bov	145	49	6	0	1	3 026

					ovi	90	30	30	0	0	115
	ANKARA	O	4	4	bov	20	20	14	0	0	700
					cap	550	5	2	1	0	0
					ovi	200	40	27	0	0	1 045
	ARDAHAN	O Not typed	6	6	bov	635	635	0	0	0	0
	AYDIN	O Not typed	5	5	bov	38	38	2	0	0	1 943
					cap	4	4	1	0	0	233
					ovi	296	296	13	0	0	1 146
	BURSA	O	2	2	bov	44	44	25	0	0	677
					cap	0	0	0	0	0	529
					ovi	0	0	0	0	0	1 655
	CANKIRI	O	2	2	bov	190	160	10	0	0	468
	CORUM	O	4	4	bov	26	15	2	0	0	960
					ovi	23	23	12	0	0	268
	DENIZLI	O	1	1	bov	110	10	1	0	0	50
	DIYARBAKIR	Not typed	1	1	bov	10	10	0	0	0	56
	ERZINCAN	Not typed	3	3	bov	51	51	0	0	0	482
					ovi	0	0	0	0	0	563
	ERZURUM	O Not typed	4	4	bov	205	205	2	0	0	1 181
					ovi	215	170	76	0	0	450
	ESKISEHIR	O	2	2	bov	7	7	0	0	0	1 172
					cap	0	0	0	0	0	55
					ovi	0	0	0	0	0	2 741
	GAZIANTEP	O	2	2	bov	9	2	0	0	0	112
	HAKKARI	A	1	1	bov	1	1	0	0	0	700
	KARABUK	Not typed	1	1	bov	12	12	1	0	0	250
	KASTAMONU	Not typed	1	1	bov	10	10	1	0	0	0
	KAYSERI	Not typed	1	1	bov	45	5	0	0	0	0
	KIRIKKALE	O	1	1	ovi	25	25	13	0	0	0
	KOCAELI	O	2	2	bov	9	9	0	0	0	61
	KONYA	A O Not typed	7	7	bov	31	31	3	0	1	2 228
					ovi	69	69	12	0	0	0
	KUTAHYA	O	1	1	bov	24	24	2	0	0	239
	MALATYA	Not typed	3	3	bov	2	2	2	0	0	120
					cap	55	55	35	0	0	425
					ovi	71	71	17	0	0	240
	MANISA	O Not typed	2	2	bov	20	20	0	0	1	1 345
	MUS	A	1	1	bov	5	5	0	0	0	0
	NEVSEHIR	O	1	1	bov	21	21	0	0	0	1 464
	NIGDE	O Not typed	4	4	bov	18	18	2	0	0	1 059
					ovi	1 400	320	8	1	0	6 361
	ORDU	Not typed	2	2	bov	10	10	1	0	0	220
	SAMSUN	A O Not typed	4	4	bov	109	106	35	0	16	1 475
	SIRNAK	O	5	5	bov	79	79	9	7	0	190
					cap	102	102	25	25	0	1 546
					ovi	140	140	14	14	0	816
	SIVAS	Not typed	2	2	bov	35	1	0	0	0	75
					ovi	205	110	0	0	0	0
	TOKAT	O Not typed	3	3	bov	83	54	2	0	0	2 074
					ovi	0	0	0	0	0	100
	TRABZON	O	1	1	bov	7	7	0	0	0	350
	YOZGAT	O Not typed	5	5	bov	21	21	5	0	0	719
					ovi	122	122	92	0	0	0
May	ADIYAMAN	O	1	1	bov	5	5	2	0	0	65
	AFYON	Not typed	2	2	bov	22	22	0	0	0	563
					ovi	750	100	40	0	0	0
	ANKARA	O Not typed	3	3	bov	104	66	5	0	0	529
					cap	0	0	0	0	0	60
					ovi	0	0	0	0	0	220
	ARDAHAN	O	1	1	bov	130	130	0	0	0	638
	AYDIN	Not typed	1	1	bov	45	45	0	0	0	138

	BURDUR	O	1	1	bov	2	2	1	0	0	0
	BURSA	O	4	4	bov	27	27	1	0	0	715
					ovi	115	115	34	0	0	1 440
	CANKIRI	A	1	1	bov	5	5	0	0	0	0
	CORUM	O Not typed	2	2	bov	510	172	40	0	0	586
	DIYARBAKIR	O Not typed	3	3	bov	12	12	2	0	0	400
	ELAZIG	O	1	1	bov	150	53	2	0	0	122
	ERZINCAN	O	1	1	bov	2	2	0	0	0	0
	ERZURUM	O Not typed	6	6	bov	1 115	509	45	0	0	903
	ESKISEHIR	O	1	1	bov	90	90	1	0	10	725
	GAZIANTEP	Not typed	1	1	bov	73	73	0	0	0	175
	ICEL	O	1	1	bov	6	2	0	0	0	0
	ISPARTA	O Not typed	2	2	bov	5	5	0	0	0	612
					cap	5	5	0	0	0	250
					ovi	30	30	0	0	0	2 600
	K. MARAS	O	1	1	bov	3	1	0	0	0	365
					ovi	0	0	0	0	0	450
	KARS	O Not typed	4	4	bov	304	304	3	0	0	1 605
	KAYSERI	O Not typed	4	4	bov	180	178	11	0	0	2 025
					ovi	67	67	34	0	0	0
	KIRIKKALE	O	4	4	bov	15	15	1	0	0	361
					ovi	10	10	0	0	0	0
	KIRSEHIR	O Not typed	2	2	bov	16	16	5	0	0	853
	KONYA	O Not typed	3	3	bov	70	22	0	0	0	1 469
					ovi	20	20	15	0	0	0
	KUTAHYA	O	1	1	bov	15	15	1	0	0	1 738
	MALATYA	O	2	2	bov	3	3	0	0	0	176
	MANISA	O	1	1	bov	11	1	0	0	0	450
	MARDIN	Not typed	1	1	bov	30	10	0	0	0	0
	NEVSEHIR	O	2	2	bov	3	3	0	0	0	325
					ovi	0	0	0	0	0	900
	NIGDE	O	1	1	bov	30	10	0	0	0	220
	SAMSUN	A O Not typed	4	4	bov	192	133	17	0	2	932
	SIVAS	O Not typed	3	3	bov	76	20	4	0	0	425
					ovi	100	20	5	0	0	450
	TOKAT	O Not typed	2	2	bov	24	24	3	0	0	2 000
	TUNCELI	O	1	1	bov	27	4	0	0	0	0
	YOZGAT	O Not typed	4	4	bov	136	68	9	0	0	420
					ovi	520	190	145	0	0	0
Jun	AGRI	O	1	1	bov	45	45	9	0	0	0
	ARTVIN	Not typed	1	1	ovi	16	16	0	1	0	280
	AYDIN	O	1	1	bov	7	0	0	0	0	98
					cap	129	104	0	0	0	957
					ovi	287	200	0	0	0	1 249
	BALIKESIR	Not typed	1	1	bov	0	0	0	0	0	2 600
					buf	28	28	2	0	0	291
					ovi	0	0	0	0	0	3 317
	CANKIRI	O	1	1	bov	18	5	1	0	0	290
	CORUM	O	1	1	bov	50	50	0	0	0	478
	DIYARBAKIR	O Not typed	3	3	bov	400	40	0	0	0	25
	ELAZIG	O Not typed	3	3	bov	16	14	1	0	0	539
					ovi	125	120	5	0	0	0
	ERZURUM	Not typed	1	1	bov	50	5	0	0	0	50
	GAZIANTEP	Not typed	2	2	bov	195	112	0	0	0	285
					cap	167	138	45	0	0	0
					ovi	201	127	24	0	0	0
	GIRESUN	O	2	2	bov	21	21	2	0	0	0
	K. MARAS	Not typed	4	4	bov	20	20	0	0	0	960
					cap	126	31	0	0	0	3 181
					ovi	157	3	0	0	0	1 002
	KARAMAN	Not typed	1	1	ovi	1 500	1 500	3	0	0	0

	KARS	O	2	2	bov	85	85	0	0	0	1 091
	KASTAMONU	Not typed	1	1	bov	10	10	0	0	0	0
	KAYSERI	Not typed	1	1	bov	245	100	8	0	0	0
	KIRSEHIR	O Not typed	2	2	bov	292	241	0	0	0	465
	KOCAELI	O	1	1	bov	4	4	0	0	0	0
	KUTAHYA	O	2	2	bov	68	63	3	0	1	488
	MALATYA	Not typed	1	1	bov	8	5	0	0	0	2 062
					cap	0	0	0	0	0	330
	MARDIN	Not typed	2	2	bov	94	94	8	0	0	0
					ovi	10	10	0	0	0	0
	NEVSEHIR	O	1	1	bov	7	5	0	0	0	753
	NIGDE	O Not typed	13	13	bov	382	159	19	0	0	2 468
					ovi	530	530	16	0	0	3 286
	OSMANIYE	O	1	1	bov	3	3	0	0	0	0
	SAKARYA	O Not typed	3	3	bov	17	17	0	0	0	89
	SAMSUN	A Not typed	5	5	bov	109	91	6	0	0	2 554
	SIRNAK	O	3	3	bov	73	25	1	1	0	206
					cap	37	37	0	0	0	680
					ovi	48	48	0	0	0	608
	TOKAT	O	2	2	bov	35	35	10	0	0	500
	TUNCELI	O	1	1	bov	19	19	0	0	0	27
	YOZGAT	Not typed	1	1	bov	40	10	4	0	0	0
					ovi	50	25	25	0	0	0
	ZONGULDAK	O Not typed	2	2	bov	6	6	0	0	0	211
Jul	AFYON	O	1	1	bov	18	18	0	0	0	19
	AYDIN	O	1	1	bov	10	6	0	0	0	528
	BITLIS	Not typed	3	3							
	BOLU	O	4	4	bov	65	15	0	0	0	1 593
	DIYARBAKIR	Not typed	1	1	bov	23	16	0	0	0	0
					cap	100	50	0	0	0	0
					ovi	600	150	45	0	0	0
	DUZCE	O Not typed	2	2	bov	44	44	3	0	0	212
	ELAZIG	O Not typed	2	2	bov	146	20	3	0	0	420
	ERZURUM	O	1	1	bov	100	100	6	0	0	0
	GAZIANTEP	Not typed	1	1	bov	24	23	0	0	0	0
	ISPARTA	Not typed	1	1	bov	6	6	1	0	0	405
					cap		0	0	0	0	140
					ovi		0	0	0	0	150
	KARS	O	1	1	bov	8	4	0	0	0	1 628
	KASTAMONU	A O	2	2	bov	227	190	0	0	0	1 262
	MALATYA	O	1	1	cap	137	17	8	0	0	1 800
					ovi	21	21	0	0	0	450
	MUS	O Not typed	4	4	bov	106	81	0	0	0	1 459
	NIGDE	O	3	3	bov	68	47	0	0	0	712
	OSMANIYE	O	2	2	bov	50	42	0	0	0	0
	RIZE	Not typed	1	1	bov	2	1	0	0	0	50
	SAKARYA	O Not typed	3	3	bov	71	30	0	0	1	714
					ovi	32	10	4	0	0	0
	SAMSUN	A	1	1	bov	2	2	0	0	0	0
	SIRNAK	O	1	1	bov	101	65	0	0	0	0
	SIVAS	A Not typed	2	2	bov	18	15	0	0	0	180
	TOKAT	O Not typed	2	2	bov	53	43	4	0	0	431
					ovi	200	180	0	0	0	0
	YOZGAT	Not typed	2	2	bov	22	20	1	0	0	477
					ovi	430	162	74	0	6	0
Aug	AFYON	O	1	1	bov	20	20	0	0	0	398
	AKSARAY	O	1	1	bov	18	12	0	0	0	273
	ARDAHAN	A	2	2	bov	180	65	13	0	0	2 275
	BAYBURT	Not typed	1	1	bov	150	150	0	0	0	0
	BILECIK	Not typed	1	1	bov	21	5	0	0	1	315
	BOLU	Not typed	1	1	bov	198	2	0	0	0	198

	BURSA	O Not typed	3	3	bov	19	15	0	0	1	451
					ovi		0	0	0	0	225
	ERZURUM	Not typed	3	3	bov	250	142	2	0	0	610
	GUMUSHANE	O Not typed	2	2	bov	65	58	2	0	0	69
	HAKKARI	A	1	1	bov	100	50	0	0	0	62
					cap	125	100	0	0	0	0
					ovi	400	300	0	0	0	0
	K. MARAS	Not typed	1	1	bov	49	49	7	0	0	250
	KARS	Not typed	2	2	bov	53	53	3	3	0	1 200
	KAYSERI	O	1	1	bov	12	12	1	1	0	154
	KONYA	O	1	1	bov	15	15	0	0	0	605
	MUS	O	2	2	bov	250	225	0	0	0	625
	NEVSEHIR	O	1	1	bov	100	1	0	0	0	99
	SAKARYA	Not typed	1	1	bov	116	29	0	0	0	85
	SAMSUN	O	1	1	bov	12	9	2	0	0	572
	SIVAS	Not typed	1	1	bov	17	17	1	0	0	370
	USAK	O Not typed	4	4	bov	57	26	0	0	0	1 598
					ovi		0	0	0	0	1 399
	YOZGAT	Not typed	1	1	bov	870	10	0	0	0	870
Sep	AFYON	O	1	1	bov	8	8	0	0	0	1 802
	ANKARA	A	1	1	bov	73	33	0	0	0	248
	ARDAHAN	A O Not typed	4	4	bov	345	275	62	0	0	4 179
	BALIKESIR	O	1	1	bov	2 000	1 520	10	0	362	2 562
	BAYBURT	A Not typed	2	2	bov	650	500	0	0	0	154
	BITLIS	O Not typed	2	2	bov	160	141	0	0	0	0
	BOLU	O	1	1	bov	13	12	1	0	0	312
	ELAZIG	O	1	1	bov	25	10	1	0	0	170
	ERZINCAN	Not typed	1	1	bov	521	20	0	0	0	868
	ERZURUM	O Not typed	6	6	bov	256	93	3	0	0	761
					buf		0	0	0	0	43
	GIRESUN	O	1	1	bov	15	15	2	0	0	75
	GUMUSHANE	O	1	1	bov	35	35	0	0	0	250
	KARS	A	1	1	bov	20	14	0	0	0	1 350
	KASTAMONU	O	2	2	bov	14	9	0	0	0	298
	KAYSERI	O Not typed	3	3	bov	123	67	5	0	0	1 401
					ovi	40	32	0	0	0	102
	KIRKLARELI	O	1	1	bov	140	83	0	0	140	1 774
					buf		0	0	0	0	98
					cap		0	0	0	0	1 841
					ovi		0	0	0	0	2 000
	KIRSEHIR	O	1	1	bov	25	25	1	0	0	229
	KOCAELI	O	1	1	ovi	94	37	36	0	0	53
	KONYA	O	1	1	bov	161	7	0	0	0	90
					ovi	100	0	0	0	0	100
	MUS	O	3	3	bov	115	62	0	0	0	1 298
	NEVSEHIR	O	2	2	bov	150	124	0	0	0	198
	NIGDE	Not typed	1	1	bov	100	1	0	0	0	134
	SAMSUN	O Not typed	4	4	bov	49	47	2	0	0	860
					buf		0	0	0	0	7
					ovi		0	0	0	0	488
	TRABZON	O	1	1	bov	12	2	0	0	0	175
Oct	AFYON	O	1	1	bov	5	5	0	0	0	236
	AKSARAY	O	1	1	bov	2	2	0	0	0	308
	BALIKESIR	O	1	1	bov	834	3	0	0	0	338
					ovi	150	0	0	0	0	111
	BAYBURT	Not typed	2	2	bov	1 696	900	0	0	0	1 100
	BOLU	A Not typed	2	2	bov	54	42	8	0	0	730
	CANKIRI	O	1	1	bov	11	8	1	0	0	100
	ERZURUM	O Not typed	3	3	bov	52	40	0	0	0	1 275
	GIRESUN	Not typed	1	1	bov	16	16	12	0	0	0
	GUMUSHANE	Not typed	1	1	bov	25	25	0	0	0	175

	HAKKARI	O	1	1	bov	12	10	0	0	0	29
	IGDIR	A O Not typed	10	10	bov	174	112	0	0	0	1 172
	KARS	A O Not typed	6	6	bov	558	127	1	0	0	4 102
	NIGDE	Not typed	1	1	bov	28	28	0	0	0	480
	RIZE	Not typed	1	1	bov	13	13	0	0	0	350
	SAMSUN	O Not typed	3	3	bov	235	235	30	0	61	2 282
Nov	BOLU	A Not typed	3	3	bov	75	51	4	0	0	552
	CANKIRI	O	1	1	bov	150	100	0	0	0	0
	IGDIR	O Not typed	4	4	bov	2 129	82	1	0	0	1 378
	MANISA	O	1	1	bov		0	0	0	0	150
					ovi	70	40	10	10	0	550
	ORDU	O	1	1	bov	11	6	0	0	0	110
					ovi		0	0	0	0	100
Dec	AFYON	Not typed	1	1	bov	27	8	1	0	0	84
	AGRI	Not typed	1	1	bov	17	10	1	0	0	0
	BALIKESIR	A O	3	3	bov	515	45	1	0	0	1 122
					ovi		0	0	0	0	242
	BARTIN	O Not typed	5	5	bov	105	37	0	0	0	687
	BOLU	A	1	1	bov	5	5	0	0	0	170
	KIRIKKALE	O Not typed	2	2	bov	28	18	1	0	0	0
	KIRSEHIR	O	1	1	bov	5	1	0	0	0	23
	MANISA	O	2	2	ovi	20	20	0	0	0	330
	SAMSUN	Not typed	1	1	bov	176	12	0	0	0	0
	SIVAS	O	1	1	bov	22	12	0	0	0	110

Peste des petits ruminants

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	BALIKESIR		1	1	ovi	18	18	9	0	0	950
	BURSA		1	1	ovi	20	20	10	0	0	1 558
	DIYARBAKIR		1	1	ovi	10	10	1	0	0	0
	EDIRNE		2	2	cap	9	9	1	1	0	810
					ovi	15	15	15	0	0	8 181
	KOCAELI		2	2	ovi	32	32	30	0	0	343
	MANISA		1	1	cap	0	0	0	0	0	4
					ovi	29	29	14	0	15	1 670
	SAKARYA		1	1	ovi	300	45	13	0	0	0
	TOKAT		1	1	ovi	50	50	20	0	0	614
	USAK		1	1	cap	0	0	0	0	0	367
					ovi	20	20	7	0	0	1 909
Feb	BALIKESIR		2	2	cap	0	0	0	0	0	400
					ovi	67	67	33	0	0	3 300
	BILECIK		1	1	ovi	20	20	15	0	0	300
	BURDUR		1	1	ovi	260	30	10	0	0	3 539
	ISTANBUL		1	1	ovi	51	51	13	0	0	1 450
	KOCAELI		3	3	cap	96	96	88	0	0	485
					ovi	83	83	83	0	0	1 200
	SAMSUN		1	1	ovi	55	55	55	0	0	520
	USAK		1	1	ovi	17	17	6	6	1	1 219
Mar	BALIKESIR		1	1	cap	265	265	147	0	0	0
					ovi	12	12	7	0	0	0
	IZMIR		1	1	cap	7	7	3	0	0	150
	KOCAELI		1	1	cap	60	60	55	0	0	91
	MARDIN		1	1	cap	120	120	15	0	0	320
Apr	BALIKESIR		1	1	cap	43	43	19	0	0	800
					ovi	0	0	0	0	0	3 200
	KOCAELI		1	1	ovi	23	23	23	0	0	180
May	CANAKKALE		2	2	cap	121	43	20	0	0	0
					ovi	39	1	0	0	0	0
	HAKKARI		1	1	ovi	150	50	50	0	0	0
	IZMIR		2	2	ovi	194	20	3	0	0	0
Jun	BALIKESIR		1	1	ovi	34	16	4	0	0	0

	ISTANBUL		1	1	ovi	36	28	20	0	0	0
	IZMIR		2	2	ovi	52	26	18	0	0	550
	KOCAELI		1	1	ovi	12	10	8	0	0	76
	MARDIN		1	1	ovi	10	10	0	0	0	0
	USAK		2	2	cap	53	53	0	0	0	53
					ovi	71	51	3	0	15	703
Jul	AYDIN		2	2	ovi	100	56	21	0	0	500
	BALIKESIR		1	1	ovi	95	86	14	0	0	0
	BURSA		1	1	ovi	59	31	3	0	0	995
	CANAKKALE		1	1	cap	70	27	15	0	0	888
					ovi		0	0	0	0	120
	DENIZLI		1	1	ovi	21	5	1	0	0	0
	ISTANBUL		1	1	ovi	90	71	10	0	0	198
	IZMIR		2	2	cap	160	52	11	0	0	4 000
					ovi	40	1	0	0	0	40
	KOCAELI		2	2	ovi	132	50	50	0	0	342
	MARDIN		1	1	ovi	20	2	0	0	0	0
	USAK		1	1	ovi	31	23	10	0	0	0
Aug	ADANA		1	1	ovi	30	26	11	0	0	300
	BALIKESIR		2	2	cap	100	20	3	0	0	600
					ovi	40	4	3	0	1	1 200
	BILECIK		1	1	cap	115	5	2	0	0	0
	CANAKKALE		2	2	cap		1	0	0	0	1 230
					ovi	243	7	7	0	0	2 080
	EDIRNE		1	1	ovi	295	8	1	0	1	300
	ESKISEHIR		1	1	ovi	300	220	20	0	0	0
	ISTANBUL		1	1	ovi	45	45	45	0	0	0
	IZMIR		1	1	ovi	325	13	12	0	0	300
	KIRKLARELI		1	1	ovi	150	20	8	0	0	2 000
	KOCAELI		1	1	cap	18	11	4	0	0	200
	MUGLA		1	1	cap	10	10	0	0	0	10
					ovi	180	180	7	0	0	180
	YALOVA		1	1	ovi	100	40	10	0	0	100
Sep	BURSA		2	2	ovi	173	56	26	0	0	150
	IZMIR		2	2	cap	35	35	17	0	0	100
					ovi	35	3	3	0	0	35
	KIRKLARELI		1	1	cap	5	5	3	0	0	500
					ovi	250	190	67	0	0	1 880
	KOCAELI		1	1	ovi	90	63	32	0	0	385
	KUTAHYA		1	1	ovi	8	7	3	0	1	2 330
	SAKARYA		1	1	ovi	41	18	18	0	0	35
	TOKAT		1	1	ovi	135	15	5	0	0	135
	USAK		1	1	ovi	365	8	4	0	0	0
Oct	BALIKESIR		4	4	cap	300	166	47	34	0	2 674
					ovi	190	30	28	0	0	2 468
	KIRKLARELI		1	1	ovi	741	76	14	0	0	0
	KOCAELI		1	1	ovi	23	9	7	0	0	200
	SAKARYA		1	1	ovi	90	60	15	0	0	900
Nov	AYDIN		1	1	ovi	116	38	13	0	0	0
	BALIKESIR		1	1	ovi	150	18	9	0	0	3 000
	BURSA		2	2	ovi	430	17	11	0	0	1 310
	ISTANBUL		1	1	ovi	33	27	6	0	0	381
	KIRKLARELI		1	1	ovi	972	173	164	0	0	0
	SAKARYA		1	1	cap	3	3	1	0	0	0
					ovi	8	8	1	0	0	0
Dec	BALIKESIR		1	1	ovi	200	17	12	0	0	1 100
	BURSA		1	1	ovi	7	7	0	0	0	443
	GIRESUN		1	1	ovi	20	16	12	0	0	100
	KOCAELI		1	1	ovi	74	20	6	0	0	95

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	AFYON		1	1	ovi	40	40	14	0	0	53
	AMASYA		1	1	ovi	20	20	14	0	0	168
	ANKARA		2	2	ovi	600	10	4	0	0	600
	ANTALYA		2	2	ovi	45	45	10	0	0	2 482
	BALIKESIR		5	5	ovi	47	76	54	0	0	6 102
	BITLIS		4	4	ovi	205	195	20	0	0	2 500
	BURDUR		2	2	ovi	6	6	1	0	0	975
	BURSA		1	1	ovi	15	15	5	0	0	880
	CANAKKALE		1	1	ovi	29	29	3	0	0	0
	ERZURUM		1	1	ovi	50	50	40	0	0	975
	ISTANBUL		1	1	ovi	68	68	0	0	0	500
	IZMIR		1	1	ovi	1	1	0	0	0	800
	K. MARAS		1	1	ovi	40	40	7	0	0	0
	MALATYA		1	1	ovi	4	4	1	0	0	0
	MANISA		1	1	ovi	50	50	47	0	0	381
	NIGDE		2	2	ovi	92	92	36	0	0	10 079
	ORDU		2	2	ovi	160	113	4	0	0	300
	SAMSUN		2	2	ovi	77	23	5	0	0	3 180
	TOKAT		3	3	ovi	162	162	92	0	18	6 557
	TRABZON		1	1	ovi	6	6	0	3	0	0
	YALOVA		2	2	cap	5	0	0	0	0	0
					ovi	158	43	30	0	2	409
Feb	ANKARA		1	1	ovi	150	20	4	0	0	0
	CANAKKALE		1	1	ovi	51	8	0	0	0	0
	DENIZLI		2	2	ovi	50	17	5	0	0	0
	ESKISEHIR		1	1	ovi	5	5	1	0	0	0
	ISTANBUL		1	1	ovi	42	42	20	0	0	0
	IZMIR		1	1	ovi	5	5	1	0	0	29
	KIRSEHIR		2	2	ovi	205	205	170	0	0	380
	KONYA		1	1	ovi	30	30	17	0	0	3 294
	MALATYA		1	1	ovi	900	900	610	0	0	0
	MANISA		1	1	ovi	104	104	81	0	0	1 541
	MUS		2	2	ovi	170	170	25	0	0	0
	ORDU		1	1	ovi	6	6	3	0	0	0
	RIZE		1	1	ovi	58	58	58	0	0	200
	TRABZON		2	2	ovi	20	13	0	0	0	589
	USAK		1	1	ovi	40	40	0	0	0	595
Mar	AFYON		1	1	cap	0	0	0	0	0	200
					ovi	2	2	1	0	0	2 000
	ANKARA		1	1	ovi	165	165	108	0	0	0
	BALIKESIR		2	2	ovi	60	60	41	0	0	1 500
	BURDUR		1	1	ovi	20	8	0	0	0	250
	CANAKKALE		1	1	ovi	3	3	0	0	0	0
	CANKIRI		1	1	ovi	320	170	130	0	0	0
	ERZURUM		1	1	ovi	50	1	1	0	0	0
	KONYA		1	1	ovi	8	8	3	0	0	0
	MUS		2	2	ovi	45	10	0	0	0	0
	NIGDE		3	3	ovi	1 210	126	60	0	0	1 600
	RIZE		1	1	ovi	300	170	170	0	0	0
	SIVAS		1	1	cap	120	15	2	0	0	0
	TOKAT		1	1	ovi	92	92	0	0	0	328
	TRABZON		2	2	ovi	15	15	14	0	0	1 600
	YALOVA		1	1	ovi	2	2	1	0	0	1 188
	YOZGAT		1	1	ovi	60	60	7	0	0	0
Apr	BALIKESIR		1	1	ovi	40	3	0	0	0	780
	BURSA		1	1	ovi	6	6	3	0	0	0
	ERZURUM		1	1	ovi	70	40	20	0	0	0
	ISTANBUL		1	1	ovi	190	8	1	0	0	0
	MALATYA		1	1	ovi	100	15	0	0	0	0

	NIGDE		2	2	ovi	810	242	160	1	0	0
	TOKAT		1	1	ovi	16	16	4	0	0	414
	USAK		1	1	ovi	107	21	2	0	0	1 692
May	KOCAELI		1	1	ovi	34	4	0	0	0	0
	USAK		1	1	ovi	131	2	1	0	0	1 898
	YOZGAT		1	1	cap	10	0	0	0	0	0
					ovi	295	5	0	0	0	0
Jul	ANTALYA		1	1	ovi	100	85	5	0	0	0
	BALIKESIR		2	2	ovi	50	33	17	0	0	2 800
	CANAKKALE		1	1	ovi	84	36	5	0	0	0
	EDIRNE		1	1	ovi	155	38	13	0	0	0
Aug	ANKARA		1	1	ovi	200	30	15	0	0	300
	BALIKESIR		2	2	ovi	60	36	3	0	0	700
	CANAKKALE		5	5	cap		0	0	0	0	2 652
					ovi	100	81	20	0	0	3 352
	EDIRNE		3	3	ovi	125	55	31	0	7	7 583
	IZMIR		1	1	ovi	45	15	1	0	0	2 000
	KIRKLARELI		1	1	ovi	150	20	10	0	0	2 000
	MUGLA		1	1	cap		0	0	0	0	800
					ovi	10	10	0	0	0	542
Sep	BALIKESIR		2	2	cap		0	0	0	0	400
					ovi	80	70	9	0	0	1 500
	BURSA		3	3	ovi	20	17	5	0	0	300
	CANAKKALE		2	2	cap		0	0	0	0	1 118
					ovi	30	30	10	0	0	675
	EDIRNE		2	2	ovi	50	32	13	0	0	2 150
	KOCAELI		1	1	ovi	100	63	32	0	0	14
	NIGDE		3	3	ovi	38	38	0	0	0	910
	TRABZON		1	1	cap		0	0	0	0	14
					ovi	15	11	0	0	0	656
Oct	ANKARA		1	1	ovi	10	10	1	0	0	2 851
	AYDIN		1	1	ovi	85	70	30	0	0	0
	ESKISEHIR		1	1	ovi	15	5	1	0	0	0
	GAZIANTEP		1	1	ovi	1 400	8	0	0	0	0
	NIGDE		1	1	ovi	120	5	0	0	0	4 181
	TEKIRDAG		1	1	ovi	45	30	15	0	0	3 000
	TOKAT		1	1	ovi	62	55	14	0	0	1 045
	USAK		1	1	ovi	213	7	0	0	0	1 156
Nov	AKSARAY		1	1	ovi	63	7	2	0	0	2 715
	BALIKESIR		1	1	ovi	80	5	3	0	0	720
	EDIRNE		3	3	cap	21	0	0	0	0	0
					ovi	402	9	0	0	0	0
	IZMIR		1	1	ovi	60	50	5	0	0	500
Dec	ANTALYA		1	1	ovi	90	22	18	0	0	0
	CANAKKALE		3	3	cap		0	0	0	0	1 736
					ovi	160	50	20	0	0	5 036
	EDIRNE		1	1	ovi	400	28	10	0	0	0
	ESKISEHIR		1	1	ovi	5	5	0	0	0	0
	GIRESUN		1	1	ovi	11	7	3	0	0	0
	KAYSERI		1	1	cap		0	0	0	0	56
					ovi	26	2	0	0	0	974
	MALATYA		1	1	ovi	200	2	1	0	0	0
	NIGDE		1	1	ovi	150	4	0	0	0	330
	TOKAT		1	1	ovi	120	4	0	0	0	310

Highly path. avian influenza

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Feb	BATMAN	H5N1	11	11	avi	21 375	282	282	21 093	0	0
	DIYARBAKIR	H5N1	6	6	avi	2 581	105	105	2 476	0	0

Newcastle disease

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	AYDIN		1	1	fau		1	1	0	0	0
	BARTIN		1	1	avi	95	95	85	10	0	0
	EDIRNE		1	1	fau		5	5	0	0	0
	ISTANBUL		1	1	avi	57	57	57	0	0	0
	KASTAMONU		1	1	avi	10	10	5	5	0	0
	SANLIURFA		1	1	avi	15	15	15	0	0	0
	SINOP		1	1	avi	30	30	30	0	0	0
	TOKAT		1	1	avi	13	13	13	0	0	0
Feb	ANKARA		2	2	fau		2	2	0	0	0
	BALIKESIR		1	1	avi	35	30	5	0	0	0
	BARTIN		1	1	avi		15	15	0	0	0
	DIYARBAKIR		1	1	avi		12	12	0	0	0
	EDIRNE		1	1	avi		11	11	0	0	0
	IZMIR		3	3	avi	37	37	37	0	0	0
					fau		1	1	0	0	0
	KASTAMONU		3	3	avi		49	47	2	0	0
	KIRSEHIR		1	1	fau		3	3	0	0	0
	MUGLA		1	1	avi		9	9	0	0	0
	SAMSUN		2	2	avi	113	113	113	0	0	0
	ZONGULDAK		2	2	avi	295	295	295	0	0	0
Mar	ANKARA		2	2	avi	43	43	43	0	0	0
	AYDIN		2	2	avi		4	4	0	0	0
					fau		2	2	0	0	0
	BATMAN		1	1	avi		12	12	0	0	0
	DIYARBAKIR		1	1	avi	150	150	150	0	0	0
	EDIRNE		1	1	fau		1	1	0	0	0
	ERZINCAN		1	1	avi		19	19	0	0	0
	GUMUSHANE		1	1	avi		50	50	0	0	0
	IZMIR		9	9	avi	35	35	35	0	0	0
					fau		10	10	0	0	0
	MANISA		1	1	avi		8	8	0	0	0
	NEVSEHIR		1	1	avi		34	34	0	0	0
	SIRNAK		1	1	avi		12	6	6	0	0
	USAK		1	1	avi	51	51	51	0	0	0
Apr	ANKARA		3	3	avi		4	4	0	0	0
					fau		2	2	0	0	0
	AYDIN		2	2	avi		20	20	0	0	0
	BURDUR		1	1	avi	50	50	50	0	0	0
	CANAKKALE		1	1	avi	50	33	33	0	0	0
	IGDIR		1	1	avi		5	1	4	0	0
	IZMIR		1	1	avi		6	6	0	0	0
	KASTAMONU		1	1	avi		5	5	0	0	0
	RIZE		1	1	avi		5	5	0	0	0
	SIRNAK		1	1	avi		18	8	10	0	0
	USAK		1	1	avi		55	55	0	0	0
Jun	ANKARA		2	2	avi		17	17	0	0	0
					fau		4	4	0	0	0
	BITLIS		1	1	avi	3	3	1	2	0	0
	CANKIRI		1	1	avi	40	15	15	0	0	0
	HAKKARI		1	1	avi		16	7	9	0	0
Jul	BARTIN		1	1	avi	38	38	38	0	0	0
Nov	CANAKKALE		1	1	avi	175	25	24	151	0	0
	GIRESUN		1	1	avi	224	207	183	41	0	0
	ISTANBUL		1	1	avi	108	70	70	38	0	0
	KOCAELI		1	1	avi	40	40	25	15	0	0
Dec	ANKARA		1	1	avi	132	132	132	0	0	0
	DENIZLI		1	1	avi	55	31	31	24	0	0
	IZMIR		1	1	avi		4	4	0	0	0
	KUTAHYA		1	1	avi	308	71	71	237	0	0

	SIIRT		1	1	avi	302	302	97	205	0	0
	TOKAT		1	1	avi	10	10	5	5	0	0

Anthrax

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	BAYBURT		1	1	bov	1	1	1	0	0	430
	BURDUR		1	1	bov	3	3	3	0	0	925
					cap	0	0	0	0	0	35
					equ	0	0	0	0	0	14
					ovi	0	0	0	0	0	587
	BURSA		1	1	ovi	1	1	1	0	0	0
	SAMSUN		1	1	bov	6	1	1	0	0	0
	TUNCELI		1	1	bov	1	1	1	0	0	0
Feb	ARTVIN		1	1	bov	1	1	1	0	0	400
					equ	0	0	0	0	0	27
					ovi	0	0	0	0	0	270
	ERZURUM		2	2	bov	15	2	2	0	0	507
	KONYA		1	1	bov	0	0	0	0	0	1 167
					ovi	2	2	2	0	0	1 279
	SAMSUN		1	1	bov	1	1	1	0	0	243
Mar	AMASYA		1	1	bov	2	2	2	0	0	503
					equ	0	0	0	0	0	47
					ovi	0	0	0	0	0	1 048
	BURDUR		1	1	bov	1	1	1	0	0	0
	DIYARBAKIR		1	1	bov	1	1	1	0	0	1 540
					ovi	10	10	10	0	0	1 800
	KARS		1	1	bov	1	1	1	0	0	1 170
	KASTAMONU		1	1	bov	2	2	2	0	0	13
	ORDU		1	1	bov	79	1	1	0	0	0
	SAMSUN		1	1	bov	1	1	0	1	0	17
Apr	ARDAHAN		1	1	bov	1	1	1	0	0	2 159
	ERZINCAN		1	1	bov	11	11	3	8	0	0
	ERZURUM		2	2	bov	6	2	2	0	0	842
	KARS		1	1	bov	2	2	2	0	0	980
					equ	1	1	1	0	0	1
May	ARDAHAN		1	1	bov	2 500	1	1	0	0	0
	BARTIN		1	1	bov	5	2	2	0	0	0
	ERZURUM		1	1	bov	1	1	1	0	0	1 320
	KIRSEHIR		1	1	bov	0	0	0	0	0	588
					ovi	30	30	30	0	0	2 480
	SAMSUN		1	1	fau		2	2	0	0	0
Jun	ELAZIG		1	1	cap	2	2	2	0	0	0
					equ	3	3	3	0	0	0
					ovi	394	1	1	0	0	0
	ERZURUM		2	2	bov	16	7	7	0	0	1 036
	KARS		2	2	bov	15	9	9	0	0	1 091
	MUS		1	1	bov	1	1	1	0	0	0
	SAMSUN		2	2	bov	20	2	2	0	0	632
Jul	ANTALYA		1	1	cap	250	11	11	0	0	0
	ARDAHAN		1	1	bov	11	11	11	0	0	2 317
					ovi		0	0	0	0	1 580
	ELAZIG		1	1	bov	5	0	0	0	0	23
					ovi	217	1	1	0	0	217
	ERZURUM		1	1	bov	26	4	4	0	0	1 176
	GUMUSHANE		1	1	bov	1	1	1	0	0	700
	ISPARTA		2	2	bov	7	2	2	0	0	1 650
					equ		0	0	0	0	75
					ovi		0	0	0	0	692
	IZMIR		1	1	ovi	30	30	30	0	0	140
	KARS		1	1	bov	166	3	3	0	0	1 244
	KASTAMONU		1	1	bov	1	1	1	0	0	0

	KIRIKKALE		1	1	bov	9	3	3	0	0	0
	MALATYA		1	1	ovi	220	12	12	0	0	220
	SAMSUN		3	3	bov	21	8	3	5	0	1 397
					ovi		0	0	0	0	56
	YOZGAT		1	1	bov	8	1	1	1	0	0
					equ	1	0	0	0	0	0
					ovi	150	9	9	0	0	6 040
Aug	AFYON		1	1	bov		0	0	0	0	55
					ovi	270	10	10	0	0	1 500
	ARDAHAN		1	1	bov		1	1	0	0	3 021
	BAYBURT		1	1	bov	21	1	1	0	0	21
	BINGOL		1	1	bov		0	0	0	0	280
					cap	1	1	1	0	0	900
					ovi	21	21	21	0	0	1 065
	ERZURUM		3	3	bov	92	4	4	0	0	3 536
	GIRESUN		1	1	bov	2	2	2	0	0	100
	KARS		2	2	bov	42	2	2	0	0	1 984
	KIRIKKALE		1	1	bov	17	2	2	0	0	0
	KIRSEHIR		1	1	bov	16	8	7	1	0	214
					ovi		0	0	0	0	1 329
	KOCAELI		1	1	bov	17	3	3	0	0	348
					ovi	69	1	1	0	0	590
	MALATYA		1	1	bov		0	0	0	0	50
					ovi	140	6	6	0	0	600
	MUS		1	1	bov	1 100	5	5	0	0	0
	NIGDE		1	1	bov		0	0	0	0	4
					equ		0	0	0	0	1
					ovi	2	2	2	0	0	3 525
	SAMSUN		1	1	bov	28	1	1	0	0	254
					ovi	22	0	0	0	0	22
	YOZGAT		1	1	bov	4	4	4	0	0	129
					ovi	40	25	25	0	0	1 486
Sep	AGRI		1	1	bov	1	1	0	1	0	0
	ANKARA		3	3	bov	35	5	5	0	0	290
					ovi	1 100	10	10	0	0	3 640
	ANTALYA		1	1	buf		0	0	0	0	350
					cap	80	1	1	0	0	1 800
					ovi		0	0	0	0	2 900
	BALIKESIR		1	1	bov		0	0	0	0	166
					ovi	120	16	16	0	0	1 121
	BILECIK		1	1	cap	2	2	2	0	0	0
					ovi	1	1	1	0	0	0
	BITLIS		1	1	bov	2	2	2	0	0	151
	BURSA		2	2	bov	1	1	1	0	0	44
					cap	1	1	1	0	0	944
					equ		0	0	0	0	20
					ovi		0	0	0	0	565
	ERZURUM		2	2	bov	500	36	36	0	0	866
	HAKKARI		1	1	cap		0	0	0	0	500
					ovi	12	12	12	0	0	700
	ISPARTA		1	1	bov		0	0	0	0	210
					cap	210	9	9	0	0	800
					equ		0	0	0	0	5
					ovi		0	0	0	0	350
	ISTANBUL		1	1	bov	3	1	1	0	0	0
	KARS		3	3	bov	27	2	2	0	0	4 446
					ovi	100	1	1	0	0	1 000
	KAYSERI		1	1	ovi	250	2	2	0	0	598
	KIRIKKALE		1	1	bov	6	1	1	0	0	0
	KONYA		2	2	bov	10	8	8	0	0	785
					ovi	20	2	2	0	0	4 240

	MUS		1	1	bov	8	8	7	1	0	0
	NIGDE		1	1	bov	4	4	4	0	0	1 530
					equ		0	0	0	0	25
					ovi	800	80	80	0	0	12 000
	SAKARYA		1	1	bov	1	1	1	0	0	0
	TOKAT		1	1	bov	1	1	0	1	0	300
	YOZGAT		1	1	bov	4	1	1	0	0	580
					cap		0	0	0	0	50
					equ		0	0	0	0	1
					ovi		0	0	0	0	800
Oct	AGRI		1	1	bov	1	1	1	0	0	0
	AMASYA		1	1	bov	25	1	1	0	0	0
	ANTALYA		1	1	bov	50	1	0	1	0	0
	BALIKESIR		1	1	bov	1	1	1	0	0	0
	ERZURUM		3	3	bov	38	5	5	0	0	2 815
	KARS		2	2	bov	51	2	2	0	0	1 895
	NIGDE		1	1	bov	3	1	1	0	0	480
Nov	ANKARA		1	1	bov		0	0	0	0	85
					ovi	56	15	15	0	0	520
	BARTIN		1	1	bov	1	1	1	0	0	454
					cap		0	0	0	0	180
					ovi		0	0	0	0	20
	ERZURUM		1	1	bov	32	1	1	0	0	354
	YOZGAT		1	1	bov	8	3	3	0	0	250
					ovi	1	1	1	0	0	500
Dec	ARDAHAN		1	1	bov	44	1	1	0	0	708
	ERZURUM		1	1	bov	18	9	9	0	0	813
	KARS		2	2	bov	17	17	12	5	0	650
	KOCAELI		1	1	bov	6	1	0	1	0	0
	SAMSUN		1	1	bov	28	2	2	0	0	780

Rabies

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	ADANA		2	2	bov	1	1	1	0	0	0
					can	1	1	1	0	0	63
	AYDIN		3	3	bov	7	3	0	3	0	496
					can	1	1	0	1	0	14
					equ	1	0	0	0	0	8
					ovi	3	0	0	0	0	9
	BINGOL		1	1	can	1	1	0	1	0	40
	BURSA		1	1	can	0	0	0	0	0	20
					ovi	4	4	4	0	0	50
	DIYARBAKIR		3	3	bov	40	1	1	0	0	0
					can	19	1	1	0	0	0
					equ	8	1	1	0	0	0
	IZMIR		3	3	bov	1	1	1	0	0	0
					can	13	1	0	1	0	0
					equ	2	0	0	0	0	0
					fau	1	1	1	0	0	0
					ovi	3	0	0	0	0	0
	SANLIURFA		1	1	can	1	1	1	0	0	0
Feb	ADANA		2	2	can	1	1	1	0	0	27
					equ	2	1	1	0	0	0
	AYDIN		2	2	bov	1	1	1	0	0	707
					can	0	0	0	0	0	9
					fau		1	1	0	0	0
	DIYARBAKIR		3	3	can	16	3	2	1	0	0
	ISTANBUL		2	2	can	30	2	1	1	0	0
	IZMIR		1	1	can	2	2	0	2	0	0
					fau		1	1	0	0	0
	MUS		1	1	can	1	1	1	0	0	0

	SANLIURFA		2	2	bov	13	1	0	1	0	0
					cap	2	2	0	2	0	0
					equ	1	1	1	0	0	0
Mar	ADANA		6	6	can	6	6	6	0	0	937
					fel	0	0	0	0	0	135
	AYDIN		1	1	bov	71	1	1	0	0	0
	BALIKESIR		2	2	bov	1	1	1	0	0	120
					can	0	0	0	0	0	62
					fau		1	1	0	0	0
	BARTIN		1	1	can	94	1	0	1	0	22
	DENIZLI		1	1	can	1	1	0	1	0	77
					fel	0	0	0	0	0	6
	DIYARBAKIR		2	2	can	1	1	1	0	0	0
					fel	2	1	1	0	0	0
	ELAZIG		3	3	can	9	3	0	3	0	33
					fau		2	1	1	0	0
	GAZIANTEP		1	1	can	1	1	1	0	0	0
	IZMIR		5	5	bov	1	1	1	0	0	0
					can	4	3	0	3	0	33
					fau	4	4	2	2	0	0
	KILIS		1	1	fau		1	0	1	0	0
	MANISA		1	1	can	2	1	1	0	0	200
	MARDIN		1	1	can	5	1	1	0	0	0
	MUGLA		1	1	can	1	1	1	0	0	0
Apr	ADANA		5	5	can	4	4	4	0	0	154
					fau		1	1	0	0	0
					fel	0	0	0	0	0	21
	BALIKESIR		2	2	can	6	2	1	1	0	12
					ovi	1	1	0	1	0	0
	BAYBURT		1	1	fel	100	1	1	0	0	0
	DIYARBAKIR		2	2	bov	1	1	0	1	0	0
					can	1	1	1	0	0	11
	DUZCE		1	1	can	1	1	1	0	0	0
	ELAZIG		2	2	bov	32	1	1	0	0	0
					can	1	1	1	0	0	10
					fau	1	1	1	0	0	0
					fel	0	0	0	0	0	2
	ERZINCAN		1	1	bov	130	0	0	0	0	0
					can	10	0	0	0	0	0
					equ	8	0	0	0	0	0
					fel	5	1	1	0	0	0
					ovi	550	0	0	0	0	0
	ERZURUM		1	1	can	4	1	1	0	0	0
	HATAY		2	2	can	5	2	2	0	0	0
	ISTANBUL		2	2	bov	1	1	1	0	0	1
					can	1	1	1	0	0	0
	IZMIR		1	1	bov	42	0	0	0	0	42
					can	55	1	0	1	0	55
					equ	12	0	0	0	0	12
					ovi	250	0	0	0	0	250
	KARS		1	1	can	1	1	1	0	0	0
	KILIS		1	1	fau		1	0	1	0	0
	MANISA		1	1	can	7	1	0	1	0	0
May	ADANA		5	5	bov	476	3	2	1	0	0
					can	200	8	4	4	0	117
					cap	40	0	0	0	0	0
					equ	2	0	0	0	0	0
					fel	20	0	0	0	0	0
	AYDIN		2	2	can	3	3	3	0	0	0
	BALIKESIR		2	2	can	2	2	0	2	0	0
	BINGOL		2	2	can	1	1	1	0	0	0

					fel	1	1	1	0	0	0
	ELAZIG		1	1	can	1	1	1	0	0	0
	ERZURUM		1	1	fau	1	1	1	0	0	0
	GAZIANTEP		3	3	can	17	3	0	3	0	12
	HATAY		1	1	can	2	2	1	1	0	0
	IGDIR		1	1	bov	1	1	0	1	0	0
					equ	1	1	0	1	0	0
	ISTANBUL		2	2	bov	5	0	0	0	0	3
					can	2	2	0	2	0	0
	IZMIR		1	1	bov	1	1	1	0	0	123
					can	0	0	0	0	0	54
					fel	0	0	0	0	0	7
					ovi	0	0	0	0	0	313
	KILIS		1	1	fau		1	1	0	0	0
	MARDIN		1	1	can	1	1	1	0	0	0
	MUGLA		1	1	bov	1	1	1	0	0	509
					can	0	0	0	0	0	38
					cap	0	0	0	0	0	72
					equ	0	0	0	0	0	32
					fel	0	0	0	0	0	5
					ovi	0	0	0	0	0	10
	MUS		1	1	can	1	1	1	0	0	0
	OSMANIYE		2	2	bov	0	0	0	0	0	41
					can	3	3	1	2	0	0
	SANLIURFA		4	4	bov	26	1	1	0	0	0
					can	3	3	3	0	0	0
	SIRNAK		1	1	ovi	100	12	10	0	2	25
	USAK		1	1	bov	47	2	2	0	0	0
					can	9	0	0	0	0	0
					fel	1	0	0	0	0	0
					ovi	270	0	0	0	0	0
Jun	BINGOL		1	1	bov	1	1	0	1	0	0
	DIYARBAKIR		1	1	bov	5	1	1	0	0	0
	ELAZIG		2	2	can	1	1	1	0	0	0
					fel	1	1	1	0	0	0
	ERZINCAN		1	1	bov	36	1	1	0	0	0
	ERZURUM		7	7	bov	24	2	2	0	0	0
					can	10	5	4	1	0	16
	GAZIANTEP		1	1	bov	1	1	1	0	0	0
	HATAY		1	1	bov	1	1	1	0	0	0
	ISTANBUL		3	3	can	3	3	3	0	0	0
	IZMIR		1	1	bov	8	1	0	1	0	8
					can	3	0	0	0	0	4
					cap	0	0	0	0	0	6
	MANISA		3	3	can	4	4	2	2	0	50
					fel	0	0	0	0	0	20
	MARDIN		1	1	can	1	1	0	1	0	72
	MUGLA		1	1	fau	1	1	1	0	0	0
	OSMANIYE		1	1	can	1	1	1	0	0	0
	SANLIURFA		1	1	can	1	1	1	0	0	0
Jul	ADANA		1	1	can	1	1	1	0	0	40
					ovi		1	1	0	0	0
	AYDIN		2	2	bov	14	1	1	0	0	830
					can		0	0	0	0	37
					fau		1	1	0	0	0
	BALIKESIR		1	1	can	589	1	1	0	0	0
	BILECIK		1	1	fel	1	1	1	0	0	0
	DENIZLI		1	1	bov	1	1	1	0	0	0
					can		0	0	0	0	30
					fel		0	0	0	0	7
	ELAZIG		1	1	can	2	1	1	0	0	19

					fel		0	0	0	0	1
	ERZURUM		3	3	bov	158	1	1	0	0	158
					can	1	1	1	0	0	15
					equ	1	1	1	0	0	0
	HATAY		1	1	can	1	1	0	1	0	0
	ICEL		1	1	can	1	1	1	0	0	0
	ISTANBUL		2	2	can	2	2	2	0	0	32
					fel		0	0	0	0	10
	IZMIR		2	2	bov		0	0	0	0	16
					can	1	1	0	1	0	20
					fel	1	1	1	0	0	0
					ovi		0	0	0	0	200
	KARS		1	1	bov	38	2	2	0	0	265
	MARDIN		1	1	can	1	1	0	1	0	0
	VAN		1	1	bov	2	1	0	1	0	0
					can	1	1	1	0	0	197
					fel		0	0	0	0	67
Aug	ADANA		3	3	bov	1	1	1	0	0	30
					can	2	2	2	0	0	130
	AYDIN		3	3	bov	6	1	1	0	0	0
					can	3	3	0	3	0	0
					fau		1	0	1	0	0
	BALIKESIR		1	1	can	1	1	1	0	0	0
	DIYARBAKIR		1	1	bov		0	0	0	0	8
					can	5	1	1	0	0	0
	HATAY		3	3	bov	1	1	1	0	0	25
					can	3	3	0	3	0	0
	ICEL		1	1	can	1	1	1	0	0	19
					fel		0	0	0	0	7
	ISTANBUL		1	1	can	3	1	1	0	0	0
	IZMIR		1	1	can	1	1	0	1	0	0
	MALATYA		1	1	can	1	1	0	1	0	0
	MUGLA		1	1	bov	450	0	0	0	0	775
					can	1	1	1	0	0	140
					cap	75	0	0	0	0	6
					equ	14	0	0	0	0	41
					ovi	150	0	0	0	0	0
	SAMSUN		1	1	can	1	1	1	0	0	0
Sep	ADANA		6	6	bov	3	3	3	0	0	0
					can	3	3	2	1	0	177
	AYDIN		3	3	bov	47	2	2	0	0	0
					can	4	0	0	0	0	53
					fau		1	1	0	0	0
	BALIKESIR		1	1	can	1	1	1	0	0	0
	ERZURUM		1	1	can	1	1	1	0	0	0
	GAZIANTEP		1	1	bov	1	1	0	1	0	0
					can		0	0	0	0	32
	ISTANBUL		1	1	can	1	1	0	1	0	32
	IZMIR		3	3	bov	2	2	2	0	0	2
					fau		1	1	0	0	0
	MANISA		4	4	bov	1	1	0	1	0	7
					can	7	1	1	0	0	789
					fel	2	2	2	0	0	41
					ovi		0	0	0	0	6
	MARDIN		1	1	bov	1	1	0	1	0	0
	NIGDE		2	2	can	15	2	1	1	0	26
					fel	8	0	0	0	0	3
Oct	ADANA		3	3	can	3	3	1	2	0	110
					fel		0	0	0	0	25
	ARDAHAN		1	1	bov	164	11	11	0	0	0
					can	9	0	0	0	0	0

					equ	7	0	0	0	0	0
					fel	11	0	0	0	0	0
	AYDIN		5	5	bov	10	1	1	0	0	182
					can	18	2	2	0	0	37
					cap		0	0	0	0	167
					equ		0	0	0	0	1
					fau		1	0	1	0	0
					fel		0	0	0	0	3
					ovi	2	2	2	0	0	844
	BALIKESIR		3	3	can	13	3	2	1	0	1 220
	BARTIN		1	1	can	32	1	1	0	0	141
	BAYBURT		1	1	bov	350	1	1	0	0	0
	BITLIS		1	1	can	1	1	1	0	0	0
	DENIZLI		1	1	bov	11	1	1	0	0	0
	ERZURUM		4	4	bov	13	1	1	0	0	0
					can	2	2	2	0	0	10
					fel	1	1	1	0	0	0
	GAZIANTEP		1	1	can	2	2	1	1	0	0
	HATAY		2	2	can	2	2	1	1	0	0
	IZMIR		1	1	fel	1	1	1	0	0	0
	KILIS		1	1	fel	1	1	0	1	0	0
	MUGLA		2	2	bov	1	1	1	0	0	0
					can	2	2	2	0	0	0
	NIGDE		1	1	bov	1	0	0	0	0	0
					can	1	1	0	1	0	0
					ovi	2	0	0	0	0	0
	SANLIURFA		1	1	bov	1	1	1	0	0	0
	USAK		2	2	bov	70	2	2	0	0	0
					can	5	0	0	0	0	0
					fel	2	0	0	0	0	0
					ovi	132	0	0	0	0	0
	ZONGULDAK		3	3	can	5	3	3	0	0	44
					fel		0	0	0	0	26
Nov	ADANA		3	3	can	3	3	3	0	0	100
	AYDIN		4	4	bov	3	3	3	0	0	96
					can	3	0	0	0	0	51
					cap		0	0	0	0	12
					equ	2	0	0	0	0	3
					fau		1	1	0	0	0
					fel		0	0	0	0	3
					ovi		0	0	0	0	15
	BALIKESIR		1	1	can	2	0	0	0	0	0
					ovi	90	2	2	0	0	0
	DENIZLI		4	4	bov	48	2	2	0	0	30
					can	8	1	1	0	0	52
					cap	4	0	0	0	0	0
					equ	2	0	0	0	0	0
					ovi	13	0	0	0	0	0
	DIYARBAKIR		1	1	bov	1	0	0	0	0	1
					can	6	1	0	1	0	15
	ERZURUM		3	3	bov	1	1	1	0	0	0
					can	3	2	1	1	0	0
	ISTANBUL		2	2	bov	23	1	1	0	0	23
					can	3	1	1	0	0	67
					ovi	3	0	0	0	0	3
	IZMIR		2	2	can	1	1	1	0	0	0
					fau		1	0	1	0	0
	KILIS		1	1	can	10	1	0	1	0	0
					equ	9	0	0	0	0	0
					fel	5	0	0	0	0	0
	MALATYA		1	1	can	1	1	1	0	0	0

	MANISA		1	1	can	2	2	1	1	0	0
	USAK		2	2	bov	24	2	2	0	0	0
					can	2	0	0	0	0	0
					ovi	60	0	0	0	0	0
Dec	ADANA		6	6	can	8	8	8	0	0	242
	ADIYAMAN		1	1	bov	2	2	1	1	0	110
					can		0	0	0	0	10
					cap		0	0	0	0	92
					fel		0	0	0	0	11
					ovi		0	0	0	0	30
	AYDIN		1	1	bov	3	1	1	0	0	0
					can	0	0	0	0	0	46
	BALIKESIR		2	2	bov	12	1	0	1	0	0
					can	1	1	0	1	0	0
	DENIZLI		1	1	can	3	1	0	1	0	0
					cap	150	0	0	0	0	0
	ERZURUM		1	1	can	8	1	0	1	0	0
	ISTANBUL		2	2	bov	82	1	1	0	0	123
					can	2	0	0	0	0	84
					fel	1	1	1	0	0	3
					ovi		0	0	0	0	7
	IZMIR		1	1	can		0	0	0	0	1
					fau		1	0	1	0	0
	MANISA		1	1	can	1	1	1	0	0	34
					fel		0	0	0	0	3
	MARDIN		1	1	bov	1	1	1	0	0	0
	TUNCELI		1	1	can	1	1	1	0	0	0
	USAK		1	1	bov	20	1	1	0	0	0
					ovi	20	0	0	0	0	0
	ZONGULDAK		1	1	bov	1	1	1	0	0	0
					can		0	0	0	0	51
					fel		0	0	0	0	10

Bovine tuberculosis

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	AFYON		1	1	bov	13	13	3	10	0	0
	BURDUR		1	1	bov	14	4	0	0	4	0
	CORUM		2	2	bov	12	12	0	0	12	0
	EDIRNE		2	2	bov	49	42	15	22	5	0
	ERZINCAN		1	1	bov	5	1	0	0	1	0
	ISPARTA		1	1	bov	12	12	0	0	12	0
	IZMIR		8	8	bov	261	8	0	0	8	0
	MALATYA		1	1	bov	1	1	0	0	1	0
	MANISA		2	2	bov	10	10	0	4	6	0
	TOKAT		1	1	bov	26	26	4	2	20	0
Feb	AYDIN		4	4	bov	162	13	0	0	13	0
	BOLU		4	4	bov	14	14	0	0	14	0
	BURDUR		1	1	bov	9	9	0	0	9	0
	CORUM		2	2	bov	44	25	2	1	22	0
	ERZINCAN		2	2	bov	9	9	2	0	7	0
	ESKISEHIR		1	1	bov	23	23	1	0	22	0
	IZMIR		7	7	bov	51	7	0	0	7	0
Mar	AMASYA		2	2	bov	3	2	0	0	2	0
	ANKARA		1	1	bov	58	15	1	2	12	0
	AYDIN		1	1	bov	1	1	0	0	1	0
	BOLU		4	4	bov	9	9	0	0	9	0
	EDIRNE		2	2	bov	26	4	0	0	4	0
	ERZINCAN		1	1	bov	1	1	0	0	1	0
	ERZURUM		1	1	bov	70	1	1	0	0	0
	ISPARTA		1	1	bov	18	18	0	2	16	0
	IZMIR		5	5	bov	108	5	1	0	4	0

	KASTAMONU		1	1	bov	7	7	0	0	7	0
	NIGDE		1	1	bov	14	1	1	0	0	0
	TEKIRDAG		1	1	bov	3	3	0	0	3	0
	YOZGAT		1	1	bov	53	1	1	0	0	0
Apr	AMASYA		2	2	bov	11	2	0	0	2	0
	BARTIN		1	1	bov	6	1	0	0	1	0
	BOLU		3	3	bov	3	3	0	0	3	0
	CORUM		1	1	bov	46	1	0	0	1	0
	EDIRNE		2	2	bov	7	5	0	0	5	0
	ISTANBUL		1	1	bov	57	1	0	0	1	0
	IZMIR		7	7	bov	87	7	0	0	7	0
	KASTAMONU		1	1	bov	2	2	0	0	2	0
	SAKARYA		1	1	bov	60	2	0	0	2	0
May	ANKARA		1	1	bov	6	1	0	0	1	0
	BARTIN		2	2	bov	3	2	0	0	2	0
	BOLU		1	1							
	EDIRNE		2	2	bov	38	2	0	0	2	0
	ESKISEHIR		1	1	bov	145	2	0	0	2	0
	IZMIR		2	2	bov	118	2	0	0	2	0
	TEKIRDAG		1	1	bov	1	1	0	1	0	0
	USAK		2	2	bov	25	24	1	1	22	0
Jun	ANKARA		1	1	bov	14	1	0	0	1	0
	AYDIN		1	1	bov	136	1	0	0	1	0
	BARTIN		1	1	bov	3	1	0	0	1	0
	BILECIK		1	1	bov	47	1	0	0	1	0
	BITLIS		1	1	bov	27	1	0	0	1	0
	BOLU		3	3	bov	23	3	0	0	3	0
	EDIRNE		4	4	bov	90	5	0	0	5	0
	ERZINCAN		1	1	bov	6	1	1	0	0	0
	IZMIR		4	4	bov	188	4	0	0	4	0
	KIRKLARELI		14	14	bov	160	38	0	0	38	0
	KONYA		1	1	bov	100	1	0	0	1	0
	TEKIRDAG		4	4	bov	21	19	0	0	19	0
Jul	AMASYA		1	1	bov	13	13	0	0	13	0
	AYDIN		2	2	bov	21	18	0	0	18	14
	BARTIN		2	2	bov	6	6	0	0	6	0
	BOLU		5	5	bov	5	5	0	1	4	0
	CORUM		1	1	bov	16	1	0	1	0	0
	EDIRNE		2	2	bov	44	44	0	0	44	0
	ELAZIG		1	1	bov	9	1	0	1	0	0
	IZMIR		8	8	bov	12	12	1	0	11	0
	KIRKLARELI		14	14	bov	50	36	0	0	36	0
	KUTAHYA		1	1	bov	5	5	0	0	5	0
	TEKIRDAG		4	4	bov	57	57	1	0	56	0
Aug	ANKARA		1	1	bov	19	19	0	4	15	0
	AYDIN		2	2	bov	34	2	0	0	2	0
	BARTIN		2	2	bov	22	5	0	2	3	0
	BOLU		5	5	bov	5	5	0	0	5	0
	BURDUR		9	9	bov	260	63	0	0	63	0
	BURSA		2	2	bov	2	2	0	0	2	0
	CORUM		2	2	bov	83	70	3	0	67	0
	EDIRNE		2	2	bov	27	6	0	1	5	0
	ERZINCAN		1	1	bov	6	1	1	0	0	0
	IZMIR		7	7	bov	7	7	0	0	7	0
	KIRKLARELI		1	1	bov	61	1	0	0	1	0
	NEVSEHIR		1	1	bov	6	1	0	0	1	0
	TEKIRDAG		1	1	bov	1	1	0	1	0	0
	USAK		1	1	bov	48	6	0	0	6	0
Sep	AFYON		1	1	bov	11	1	1	0	0	0
	AYDIN		4	4	bov	183	4	0	2	2	0
	BARTIN		1	1	bov	29	1	0	0	1	0

	BOLU		4	4	bov	57	44	0	7	37	0
	CORUM		3	3	bov	28	6	1	3	2	0
	ERZINCAN		1	1	bov	11	5	1	0	4	0
	ISPARTA		1	1	bov	2	1	0	0	1	0
	ISTANBUL		1	1	bov	84	78	0	0	78	0
	IZMIR		10	10	bov	127	49	0	1	48	0
	KASTAMONU		2	2	bov	59	56	0	0	56	0
	KIRKLARELI		2	2	bov	2	2	0	0	2	0
	MANISA		1	1	bov	1	1	0	0	1	0
	SAMSUN		1	1	bov	5	5	0	0	5	0
	TEKIRDAG		2	2	bov	42	42	0	2	40	0
	TOKAT		1	1	bov	11	11	1	0	10	0
Oct	BOLU		3	3	bov	8	7	0	0	7	0
	BURDUR		6	6	bov	88	63	2	0	61	0
	BURSA		1	1	bov	4	4	0	0	4	0
	CORUM		1	1	bov	2	1	0	0	1	0
	EDIRNE		1	1	bov	45	1	0	0	1	0
	ELAZIG		1	1	bov	9	9	0	1	8	0
	ERZINCAN		1	1	bov	4	1	1	0	0	0
	IZMIR		4	4	bov	4	4	0	0	4	0
	MANISA		3	3	bov	7	3	0	0	3	9
	TEKIRDAG		3	3	bov	22	22	1	1	20	0
Nov	AYDIN		1	1	bov	94	1	0	0	1	0
	BARTIN		2	2	bov	14	2	0	0	2	0
	BOLU		5	5	bov	5	5	0	0	5	0
	BURDUR		7	7	bov	136	100	3	0	97	0
	CORUM		2	2	bov	108	3	1	1	1	0
	ELAZIG		1	1	bov	20	1	0	1	0	0
	IZMIR		7	7	bov	7	7	0	0	7	0
	KONYA		1	1	bov	47	1	0	0	1	0
	TEKIRDAG		1	1	bov	11	11	0	1	10	0
	TOKAT		3	3	bov	19	3	0	3	0	0
Dec	ANKARA		1	1	bov	5	1	0	0	1	0
	BOLU		4	4	bov	4	4	0	0	4	0
	CORUM		1	1	bov	3	1	0	1	0	0
	IZMIR		3	3	bov	11	3	0	0	3	0
	KASTAMONU		1	1	bov	23	21	0	0	21	0
	KIRKLARELI		1	1	bov	2	2	0	0	2	0
	KONYA		1	1	bov	304	28	0	0	28	0
	SAKARYA		1	1	bov	4	1	0	0	1	0
	TOKAT		1	1	bov	14	1	0	1	0	0
	USAK		1	1	bov	13	1	0	0	1	0

Viral haemorrhagic septicaemia

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
May	BOLU		1	1	pis	500	500	500	0	0	0

American foulbrood of honey bees

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Feb	ADANA		1	1	api	121	121	0	0	0	0
Mar	ANTALYA		1	1	api	206	206	95	0	0	0
	HATAY		1	1	api	150	150	150	0	0	0
	YOZGAT		1	1	api	2	2	0	2	0	0
Apr	ANTALYA		1	1	api	39	6	4	2	0	0
May	GIRESUN		1	1	api	25	20	20	0	0	0
	KASTAMONU		1	1	api	11	1	0	0	0	0
Jun	ERZURUM		1	1	api	99	1	0	1	0	0
	GIRESUN		1	1	api	22	22	8	0	0	0
Jul	ELAZIG		1	1	api	87	6	6	0	0	0
	KARABUK		1	1	api	20	20	20	0	0	0
Aug	ELAZIG		1	1	api	30	2	0	2	0	0

	TUNCELI		1	1	api	39	35	35	0	0	0
Sep	SAMSUN		1	1	api	13	13	10	3	0	0

Varroosis of honey bees

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	AYDIN		1	1	api	30	30	0	0	0	0
	CANKIRI		1	1	api	58	40	40	0	0	0
	GIRESUN		1	1	api	35	35	16	0	0	0
	MALATYA		1	1	api	70	70	70	0	0	0
	TRABZON		2	2	api	150	150	45	0	0	0
Feb	BITLIS		1	1	api	21	21	21	0	0	0
	ICEL		1	1	api	200	200	140	0	0	0
	K. MARAS		1	1	api	32	13	13	0	0	0
	KARABUK		2	2	api	42	42	41	0	0	0
	KASTAMONU		1	1	api	70	70	70	0	0	0
	ORDU		1	1	api	23	23	23	0	0	0
	SAKARYA		2	2	api	210	210	185	0	0	0
	TUNCELI		1	1	api	100	100	97	0	0	0
Mar	ADANA		1	1	api	121	121	0	0	0	0
	ARTVIN		1	1	api	350	39	39	0	0	0
	DIYARBAKIR		2	2	api	222	222	222	0	0	0
	EDIRNE		1	1	api	35	35	35	0	0	0
	ELAZIG		7	7	api	542	542	542	0	0	0
	GIRESUN		1	1	api	26	26	26	0	0	0
	HAKKARI		2	2	api	113	113	113	0	0	0
	HATAY		1	1	api	250	250	150	0	0	0
	KARABUK		1	1	api	20	20	17	0	0	0
	MALATYA		1	1	api	50	50	50	0	0	0
	SAMSUN		1	1	api	60	60	60	0	0	0
	SIIRT		2	2	api	508	508	174	0	0	0
	SIVAS		1	1	api	130	117	117	0	0	0
	TUNCELI		5	5	api	279	206	204	0	0	0
Apr	ADANA		3	3	api	617	617	500	37	0	0
	ARDAHAN		6	6	api	568	568	60	0	0	0
	ARTVIN		1	1	api	115	115	1	0	0	0
	ELAZIG		6	6	api	128	121	121	0	0	0
	HAKKARI		6	6	api	310	310	310	0	0	0
	ICEL		1	1	api	74	74	0	0	0	0
	TUNCELI		1	1	api	170	116	116	0	0	0
May	AFYON		1	1	api	2	2	2	0	0	0
	ANTALYA		1	1	api	30	15	12	0	0	0
	BARTIN		4	4	api	80	4	0	0	0	0
	CANKIRI		2	2	api	8	4	4	0	0	0
	ELAZIG		1	1	api	100	100	20	0	0	0
	GIRESUN		1	1	api	25	20	20	0	0	0
	TUNCELI		1	1	api	1 050	15	15	0	0	0
Jun	CANKIRI		1	1	api	40	30	30	0	0	0
	HATAY		1	1	api	200	200	0	0	0	0

Brucellosis (Brucella abortus)

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	AGRI		5	5	bov	8	5	0	0	5	37
	AMASYA		1	1	bov	11	1	0	0	1	0
	ARDAHAN		1	1	bov	18	12	0	0	12	0
	BAYBURT		2	2	bov	64	6	0	0	6	0
	BITLIS		2	2	bov	7	7	0	0	7	0
	CANKIRI		4	4	bov	117	4	0	2	2	0
	CORUM		4	4	bov	68	42	0	0	42	0
	ERZINCAN		2	2	bov	13	2	0	0	2	0
	ERZURUM		9	9	bov	224	15	0	0	15	0
	ESKISEHIR		1	1	bov	4	1	0	0	1	0

	GIRESUN		10	10	bov	36	31	0	0	31	1 630
	GUMUSHANE		1	1	bov	1	1	0	0	1	0
	KARS		2	2	bov	30	11	0	0	11	46
	KIRKLARELI		1	1	bov	172	13	0	0	13	0
	KONYA		18	18	bov	27	27	0	0	27	0
	KUTAHYA		1	1	bov	15	1	0	0	1	0
	SIVAS		3	3	bov	94	6	0	0	6	0
	TOKAT		1	1	bov	3	1	0	0	1	0
	VAN		9	9	bov	33	13	0	0	13	0
Feb	AGRI		1	1	bov	15	1	0	0	1	0
	AKSARAY		1	1	bov	6	2	0	0	2	0
	AMASYA		1	1	bov	3	1	0	0	1	0
	AYDIN		1	1	bov	1	1	0	0	1	0
	BAYBURT		4	4	bov	26	4	0	0	4	110
	BINGOL		2	2	bov	4	3	0	0	3	0
	BITLIS		1	1	bov	2	2	0	0	2	0
	CANKIRI		5	5	bov	20	5	0	0	5	0
	CORUM		3	3	bov	17	5	0	0	5	125
	ERZINCAN		8	8	bov	26	8	0	0	8	0
	ERZURUM		7	7	bov	68	7	0	0	7	0
	GIRESUN		1	1	bov	9	9	0	0	9	0
	KARABUK		1	1	bov	14	14	10	0	4	0
	KARS		1	1	bov	4	1	0	0	1	0
	KASTAMONU		1	1	bov	15	1	0	0	1	0
	KIRSEHIR		3	3	bov	27	11	0	0	11	0
	KONYA		2	2	bov	307	15	8	0	7	0
	MUGLA		1	1	bov	5	1	0	0	1	0
	NEVSEHIR		1	1	bov	7	7	0	0	7	0
	SIVAS		7	7	bov	63	11	0	0	11	0
	TOKAT		1	1	bov	5	1	0	0	1	0
	TUNCELI		1	1	bov	2	2	0	0	2	0
Mar	AFYON		1	1	bov	9	1	0	0	1	0
	AMASYA		2	2	bov	13	11	1	0	10	0
	BAYBURT		1	1	bov	19	1	0	0	1	0
	BITLIS		3	3	bov	10	10	0	0	10	6
	CANKIRI		1	1	bov	45	1	0	0	1	0
	CORUM		3	3	bov	20	11	0	0	11	0
	ERZINCAN		16	16	bov	80	20	0	2	18	781
	ERZURUM		7	7	bov	60	8	0	0	8	0
	GIRESUN		1	1	bov	1	1	0	0	1	0
	KAYSERI		68	68	bov	195	112	15	0	97	0
	KIRSEHIR		1	1	bov	18	1	0	0	1	0
	SIVAS		1	1	bov	5	3	0	0	3	0
	TOKAT		17	17	bov	53	29	0	0	29	0
Apr	ARDAHAN		1	1	bov	4	1	0	0	1	0
	BINGOL		2	2	bov	10	3	0	0	3	0
	BITLIS		2	2	bov	9	9	0	0	9	11
	BOLU		1	1	bov	12	4	0	0	4	0
	BURSA		1	1	bov	1	1	0	0	1	0
	CANKIRI		1	1	bov	7	1	0	0	1	0
	CORUM		1	1	bov	6	6	0	0	6	126
	EDIRNE		1	1	bov	22	1	0	0	1	0
	ELAZIG		1	1	bov	3	3	0	0	3	0
	ERZINCAN		23	23	bov	59	35	0	5	30	828
	ERZURUM		5	5	bov	118	6	0	0	6	0
	IZMIR		1	1	bov	1	1	1	0	0	0
	KIRSEHIR		7	7	bov	139	26	0	0	26	0
	MALATYA		1	1	bov	11	11	0	0	11	0
May	ARTVIN		1	1	bov	8	2	0	0	2	0
	BINGOL		5	5	bov	35	9	0	0	9	0
	CANKIRI		4	4	bov	20	4	0	0	4	0

	CORUM		2	2	bov	2	2	0	0	2	0
	DENIZLI		1	1	bov	4	1	0	0	1	0
	ERZURUM		1	1	bov	3	1	0	0	1	620
	GUMUSHANE		2	2	bov	9	2	0	0	2	0
	KARS		1	1	bov	2	2	0	0	2	49
	KAYSERI		2	2	bov	8	2	0	0	2	0
	KIRSEHIR		1	1	bov	12	1	0	0	1	0
	MUS		1	1	bov	23	2	0	0	2	0
	NEVSEHIR		2	2	bov	16	16	0	0	16	0
	TEKIRDAG		1	1	bov	2	2	0	0	2	0
	TUNCELI		2	2	bov	3	3	0	0	3	0
	VAN		2	2	bov	2	2	0	0	2	0
Jun	AFYON		2	2	bov	3	3	0	0	3	0
	BAYBURT		1	1	bov	14	1	0	0	1	0
	DIYARBAKIR		2	2	bov	358	7	0	0	7	0
	ERZINCAN		4	4	bov	4	4	0	2	2	576
	ERZURUM		1	1	bov	1	1	0	0	1	0
	KARS		1	1	bov	48	1	0	0	1	0
	KIRSEHIR		3	3	bov	7	3	0	0	3	0
	KONYA		2	2	bov	15	12	0	0	12	0
	NEVSEHIR		3	3	bov	12	8	0	1	7	0
Jul	ADANA		1	1	bov	10	1	0	0	1	0
	ADIYAMAN		1	1	bov	94	2	0	0	2	0
	ANKARA		1	1	bov	4	1	0	0	1	0
	DIYARBAKIR		1	1	bov	124	26	0	0	26	0
	ERZINCAN		3	3	bov	12	3	1	0	2	1 150
	KARS		1	1	bov	8	1	0	0	1	7
	MANISA		1	1	bov	1	1	1	0	0	0
	NEVSEHIR		1	1	bov	1	1	0	0	1	0
	SANLIURFA		1	1	bov	17	1	0	0	1	0
	SIVAS		3	3	bov	48	7	1	0	6	746
	TEKIRDAG		2	2	bov	17	17	0	0	17	0
Aug	BOLU		1	1	bov	10	1	0	0	1	0
	DIYARBAKIR		1	1	bov	27	2	0	0	2	0
	ERZINCAN		1	1	bov	1	1	0	0	1	575
	IZMIR		1	1	bov	34	34	0	0	34	8
	KARS		1	1	bov	48	1	0	0	1	0
	KAYSERI		3	3	bov	10	3	0	0	3	0
	KOCAELI		1	1	bov	14	2	0	0	2	0
	KONYA		1	1	bov	3	3	0	0	3	0
	MALATYA		1	1	bov	35	4	0	0	4	0
	SAMSUN		1	1	bov	305	3	1	0	2	0
	SIVAS		1	1	bov	15	8	0	0	8	5
	TOKAT		2	2	bov	9	4	0	0	4	0
	VAN		5	5	bov	7	7	0	0	7	0
Sep	AMASYA		1	1	bov	1	1	0	0	1	0
	ANTALYA		1	1	bov	49	43	0	0	43	0
	BITLIS		1	1	bov	4	1	0	0	1	0
	CORUM		2	2	bov	153	14	0	0	14	0
	DIYARBAKIR		1	1	bov	233	12	0	0	12	0
	ESKISEHIR		1	1	bov	22	13	0	1	12	0
	MALATYA		1	1	bov	35	4	0	0	4	0
	SIVAS		1	1	bov	32	8	1	0	7	7
Oct	AMASYA		1	1	bov	9	1	0	0	1	8
	BAYBURT		2	2	bov	20	2	0	0	2	0
	BURSA		1	1	bov	25	25	0	0	25	0
	CANKIRI		1	1	bov	29	1	0	0	1	0
	CORUM		2	2	bov	34	10	0	0	10	0
	ERZURUM		1	1	bov	1	1	0	0	1	0
	ESKISEHIR		1	1	bov	56	1	0	0	1	0
	KARS		21	21	bov	183	37	0	0	37	0

	KONYA		2	2	bov	234	165	9	39	117	0
	MANISA		3	3	bov	4	3	0	0	3	0
	TUNCELI		1	1	bov	2	1	0	0	1	0
	USAK		1	1	bov	23	1	0	0	1	0
Nov	BAYBURT		1	1	bov	5	1	0	0	1	0
	BINGOL		1	1	bov	64	1	0	0	1	0
	BURSA		1	1	bov	18	18	0	0	18	0
	CANKIRI		1	1	bov	3	3	0	0	3	0
	CORUM		4	4	bov	17	9	0	0	9	0
	ERZURUM		11	11	bov	82	12	0	0	12	0
	KARS		6	6	bov	62	9	0	0	9	7
	KAYSERI		2	2	bov	3	3	0	0	3	0
	KIRSEHIR		3	3	bov	22	5	0	0	5	0
	KOCAELI		2	2	bov	22	3	0	0	3	0
	MALATYA		2	2	bov	12	7	0	0	7	0
	SIVAS		1	1	bov	14	6	0	0	6	9
	TOKAT		14	14	bov	64	17	0	0	17	0
	YOZGAT		15	15	bov	2 031	31	0	0	31	0
Dec	AFYON		1	1	bov	28	17	0	0	17	0
	AGRI		1	1	bov	3	3	0	0	3	6
	AKSARAY		1	1	bov	9	1	0	0	1	0
	AMASYA		1	1	bov	11	1	0	0	1	0
	BITLIS		2	2	bov	3	3	0	0	3	0
	CANKIRI		3	3	bov	125	9	0	0	9	0
	EDIRNE		1	1	bov	68	8	0	0	8	0
	ERZINCAN		3	3	bov	11	3	0	0	3	575
	ERZURUM		10	10	bov	37	10	0	0	10	0
	ESKISEHIR		1	1	bov	29	1	0	0	1	0
	KASTAMONU		1	1	bov	21	1	0	0	1	0
	KIRSEHIR		1	1	bov	21	5	0	0	5	0
	KONYA		2	2	bov	29	16	0	0	16	2
	MALATYA		1	1	bov	13	1	0	0	1	0
	SAKARYA		1	1	bov	4	4	0	0	4	0
	SIVAS		7	7	bov	142	9	0	0	9	0
	TOKAT		1	1	bov	4	4	0	0	4	0

Brucellosis (Brucella melitensis)

Month	**Administration**	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Ring vaccinated**
Jan	ADANA		1	1	ovi	15	1	0	0	1	0
	ANKARA		1	1	ovi	20	20	0	0	20	208
	ANTALYA		2	2	ovi	55	55	0	0	55	100
	BURDUR		1	1	ovi	25	25	0	0	25	0
	CANAKKALE		3	3	cap	90	3	2	0	1	1 509
					ovi	0	0	0	0	0	1 685
	CANKIRI		1	1	ovi	15	15	0	0	15	620
	ELAZIG		4	4	ovi	75	75	0	0	75	0
	ERZINCAN		3	3	ovi	19	3	0	0	3	600
	ERZURUM		1	1	ovi	9	1	0	0	1	0
	ESKISEHIR		1	1	ovi	4	4	0	0	4	0
	IGDIR		1	1	ovi	1	1	0	1	0	0
	ISPARTA		1	1	ovi	5	5	0	0	5	35
	IZMIR		3	3	cap	26	26	0	0	26	67
					ovi	1	1	0	0	1	280
	KARAMAN		1	1	ovi	10	10	0	0	10	200
	KIRIKKALE		2	2	ovi	3	3	1	0	2	0
	KOCAELI		2	2	ovi	17	17	7	0	10	680
	KONYA		6	6	ovi	280	89	0	0	89	0
	MUGLA		1	1	cap	5	5	0	0	5	0
	NIGDE		1	1	ovi	2	2	1	0	1	200
	OSMANIYE		1	1	ovi	15	15	0	0	15	480
	SAMSUN		1	1	ovi	20	10	0	0	10	0

	TEKIRDAG		1	1	ovi	5	5	0	0	5	95
	YOZGAT		1	1	cap	2	0	0	0	0	15
					ovi	170	10	0	0	10	1 000
Feb	AFYON		1	1	ovi	18	18	0	0	18	0
	AMASYA		1	1	cap	12	12	0	0	12	170
	ANKARA		1	1	ovi	1	1	0	0	1	71
	ANTALYA		2	2	cap	200	100	0	0	100	0
					ovi	2	2	0	0	2	150
	BURSA		1	1	cap	5	5	0	0	5	186
	CORUM		3	3	ovi	33	33	20	1	12	860
	EDIRNE		1	1	ovi	185	1	0	0	1	0
	ERZINCAN		2	2	ovi	47	17	0	0	17	0
	ERZURUM		3	3	ovi	270	3	0	0	3	80
	ESKISEHIR		1	1	cap	1	1	0	0	1	530
					ovi	0	0	0	0	0	1 405
	ISPARTA		2	2	ovi	90	90	0	0	90	213
	K. MARAS		1	1	ovi	3	3	0	0	3	0
	KASTAMONU		1	1	cap	49	1	0	0	1	0
	KOCAELI		1	1	cap	7	1	0	0	1	125
	KUTAHYA		1	1	cap	12	12	0	0	12	400
					ovi	7	7	0	0	7	430
	SIVAS		1	1	ovi	98	2	0	0	2	0
	TOKAT		2	2	ovi	150	2	0	0	2	0
	TUNCELI		1	1	ovi	7	7	0	0	7	0
	USAK		2	2	ovi	26	26	0	0	26	710
	YOZGAT		1	1	ovi	15	1	0	0	1	0
Mar	AGRI		2	2	ovi	8	8	5	0	3	59
	AMASYA		2	2	cap	1	1	0	0	1	200
					ovi	130	6	0	0	6	0
	ARTVIN		1	1	ovi	70	70	4	0	66	347
	BAYBURT		1	1	ovi	110	40	0	0	40	0
	BURSA		1	1	ovi	15	15	0	0	15	115
	CANAKKALE		2	2	cap	15	15	0	0	15	2 036
					ovi	25	25	0	0	25	633
	CORUM		1	1	ovi	4	4	0	0	4	70
	DENIZLI		1	1	ovi	80	20	0	0	20	0
	ERZURUM		3	3	cap	60	1	0	0	1	0
					ovi	150	2	0	0	2	0
	KAYSERI		2	2	ovi	210	61	0	0	61	0
	KOCAELI		1	1	ovi	2	2	0	0	2	160
	KONYA		4	4	ovi	180	5	0	0	5	0
	MUGLA		1	1	cap	2	2	0	0	2	53
	SIVAS		1	1	ovi	130	20	0	0	20	0
	USAK		1	1	cap	0	0	0	0	0	80
					ovi	8	8	0	0	8	470
Apr	CANAKKALE		1	1	cap	5	5	0	0	5	450
					ovi	0	0	0	0	0	3
	EDIRNE		1	1	ovi	1	1	0	0	1	2 948
	ESKISEHIR		1	1	ovi	2	2	0	0	2	1 323
	ISPARTA		1	1	ovi	31	31	0	0	31	200
	KASTAMONU		1	1	ovi	35	35	10	0	25	0
	KIRKLARELI		3	3	ovi	345	21	0	0	21	0
	SIVAS		1	1	ovi	1	1	0	0	1	2 450
	TEKIRDAG		2	2	ovi	8	8	0	0	8	0
May	ANKARA		1	1	ovi	295	1	0	0	1	0
	ANTALYA		2	2	ovi	330	45	0	0	45	0
	BOLU		1	1	ovi	152	2	0	0	2	0
	BURSA		2	2	ovi	17	17	0	0	17	1 243
	CANAKKALE		1	1	cap	300	1	0	0	1	0
	CORUM		1	1	ovi	70	2	0	0	2	0
	DENIZLI		1	1	ovi	17	2	0	0	2	0

	ISPARTA		1	1	ovi	4	3	0	0	3	0
	KARS		1	1	ovi	52	7	0	0	7	0
Jun	KAYSERI		2	2	ovi	740	60	0	0	60	0
	KIRKLARELI		1	1	ovi	150	80	0	0	80	0
	MARDIN		1	1	ovi	800	10	0	0	10	0
	SIVAS		1	1	ovi	233	4	0	0	4	0
	TRABZON		1	1	ovi	600	3	0	0	3	0
Jul	AMASYA		2	2	ovi	200	5	0	0	5	0
	BALIKESIR		1	1	ovi	10	10	0	0	10	0
	CANAKKALE		1	1	ovi	78	20	0	0	20	0
	NEVSEHIR		1	1	ovi	100	2	0	0	2	350
Aug	AMASYA		1	1	ovi	70	2	0	0	2	180
	CANAKKALE		1	1	ovi	80	7	0	0	7	243
	KIRKLARELI		1	1	cap	400	1	0	0	1	0
					ovi	50	0	0	0	0	380
	NIGDE		1	1	ovi	4	4	0	0	4	3 272
Sep	ANTALYA		1	1	ovi	10	2	0	0	2	0
	SAMSUN		4	4	ovi	208	17	0	0	17	640
	SIVAS		1	1	ovi	146	4	0	0	4	0
Oct	ADANA		1	1	ovi	10	1	0	0	1	700
	AFYON		1	1	ovi	130	32	2	0	30	98
	BALIKESIR		1	1	ovi	100	5	0	0	5	780
	BURSA		3	3	ovi	134	10	0	0	10	701
	CANAKKALE		1	1	cap	100	19	0	0	19	1 772
	EDIRNE		3	3	ovi	128	6	0	0	6	2 369
	ESKISEHIR		1	1	ovi	10	1	0	0	1	0
	ISPARTA		1	1	ovi	190	3	0	0	3	190
	KUTAHYA		1	1	ovi	125	10	0	0	10	0
	SIVAS		1	1	ovi	300	2	0	0	2	0
	TEKIRDAG		1	1	ovi	15	1	0	0	1	85
Nov	AFYON		2	2	ovi	245	2	0	0	2	130
	BALIKESIR		2	2	ovi	490	2	0	0	2	400
	BURSA		3	3	ovi	20	14	3	0	11	901
	CANAKKALE		2	2	cap	81	4	0	0	4	0
					ovi	20	1	0	0	1	565
	CANKIRI		1	1	ovi	50	5	0	0	5	0
	DENIZLI		2	2	ovi	190	8	0	0	8	0
	EDIRNE		3	3	cap	21	0	0	0	0	0
					ovi	166	11	0	0	11	1 276
	ESKISEHIR		1	1	ovi	10	2	0	0	2	0
	ISPARTA		1	1	ovi	8	4	0	0	4	98
	ISTANBUL		1	1	ovi	425	1	0	0	1	450
	IZMIR		1	1	cap	15	1	0	0	1	70
	KONYA		1	1	ovi	100	2	0	0	2	100
	USAK		1	1	ovi	80	29	0	0	29	500
Dec	ADANA		1	1	ovi	145	2	0	0	2	130
	AFYON		3	3	ovi	205	3	0	0	3	450
	AGRI		1	1	ovi	10	1	0	0	1	140
	AMASYA		1	1	ovi	70	10	0	0	10	0
	ANKARA		2	2	ovi	78	8	0	0	8	161
	BURSA		2	2	ovi	45	10	0	0	10	100
	CANAKKALE		4	4	cap	248	11	0	0	11	0
					ovi	315	1	0	0	1	0
	CORUM		3	3	ovi	249	8	0	0	8	0
	EDIRNE		2	2	ovi	123	22	0	0	22	0
	IZMIR		2	2	cap	11	3	0	0	3	8
					ovi	5	1	0	0	1	0
	K. MARAS		1	1	cap		0	0	0	0	20
					ovi	15	2	0	0	2	160
	KONYA		4	4	ovi	100	76	0	0	76	750
	KUTAHYA		1	1	ovi	35	17	0	0	17	0

	SAMSUN		1	1	ovi	92	8	0	0	8	100
	TRABZON		1	1	ovi	6	1	0	0	1	0

4. Unreported Diseases		
Multiple species		
Aujeszky's disease	Echinococcosis/hydatidosis	Heartwater
Leptospirosis	Q fever	Paratuberculosis
O. w. screwworm (C. bezziana)	Trichinellosis	Japanese encephalitis
Tularemia	Listeriosis	Toxoplasmosis
Blackleg	Botulism	Other clostridial infections
Other pasteurelloses	Actinomycosis	Intestinal Salmonella infections
Coccidiosis	Distomatosis (liver fluke)	Filariosis
Enterotoxaemia	Salmonellosis (S. abortusequi)	Brucellosis
Salmonellosis	Crimean Congo haemorrhagic fever	West Nile Fever
Brucellosis (Brucella suis)		
Cattle		
Contagious bov. pleuropneumonia	Bovine anaplasmosis	Bovine babesiosis
Bovine brucellosis	Bov. genital campylobacteriosis	Bovine cysticercosis
Dermatophilosis	Enzootic bovine leukosis	Haemorrhagic septicaemia
Inf.bov.rhinotracheit. (IBR/IPV)	Theileriosis	Trichomonosis
Trypanosomosis	Mucosal disease/DVB	Warble infestation
Bovine viral diarrhoea		
Sheep/Goats		
Ovine epididymitis (B. ovis)	Caprine arthritis/encephalitis	Contagious agalactia
Contagious cap. pleuropneumonia	Enzootic abortion (chlamydiosis)	Ovine pulmonary adenomatosis
Nairobi sheep disease	Salmonellosis (S. abortusovis)	Scrapie
Maedi-visna	Contagious pustular dermatitis	Foot-rot
Contagious ophthalmia	Caseous lymphadenitis	Sheep mange
Swine		
Atrophic rhinitis of swine	Transmissible gastroenteritis	Enterovirus encephalomyelitis
Porcine reproductive/respiratory syndr.	Melioidosis	Vibrionic dysentery
Swine erysipelas	Nipah virus encephalitis	
Equidae		
African horse sickness	Contagious equine metritis	Epizootic lymphangitis
Equine influenza	Equine piroplasmosis	Equine rhinopneumonitis
Horse pox	Equine viral arteritis	Horse mange
Surra (Trypanosoma evansi)	Venezuelan equ.encephalomyelitis	Equine coital exanthema
Ulcerative lymphangitis	Strangles	Encephalomyelitis (East.)
Encephalomyelitis (West.)		
Lagomorphs		
Myxomatosis	Rabbit haemorrhagic disease	
Birds		
Avian infectious bronchitis	Avian infect. laryngotracheitis	Avian tuberculosis
Duck virus hepatitis	Duck virus enteritis	Fowl cholera
Fowl pox	Infec bursal disease (Gumboro)	Marek's disease
Mycoplasmosis (M. gallisepticum)	Avian chlamydiosis	Infectious coryza
Avian encephalomyelitis	Avian spirochaetosis	Other avian salmonellosis
Avian leukosis	Turkey rhinotracheitis	Avian mycoplasmosis (M.synoviae)
Low pathogenic avian influenza (poultry)		
Bees		
Acarapisosis of honey bees	European foulbrood of honey bees	Tropilaelaps infestation of honey bees
Small hive beetle infestation		
Other		
Leishmaniosis	Camelpox	
Fish		
Spring viraemia of carp	Infect. haematopoietic necrosis	Epizoot. haematopoietic necrosis
Infectious salmon anaemia	Epizootic ulcerative syndrome	Gyrodactylosis (Gyrodactylus salaris)
Red sea bream iridoviral disease	Koi herpesvirus disease	
Molluscs		
Infection with Bonamia ostreae	Infection with Bonamia exitiosa	Infection with Marteilia refringens

Infection with Perkinsus marinus	Abalone viral mortality	
Crustaceans		
Taura syndrome	White spot disease	Yellow head disease
Spherical baculovirosis (Penaeus monodon-type baculovirus)	Tetrahedral baculovirosis (Baculovirus penaei)	Infectious hypodermal and haematopoietic necrosis
Crayfish plague (Aphanomyces astaci)		

5. Zoonoses in Humans

Disease Name	Present diseases	Cases	Deaths
Anthrax	+	262	
Avian chlamydiosis	...	...	
Botulism	...	...	
Bovine cysticercosis	...	...	
Bovine tuberculosis	...	...	
Brucellosis	+	11 803	
Campylobacteriosis	+	431	
Crimean Congo haemorrhagic fever	+	717	33
Ebola haemorrhagic fever	...	...	
Echinococcosis/hydatidosis	+	379	
Escherichia coli O157	+	61	
Glanders	...	...	
Hantavirus pulmonary syndrome	...	...	
Highly pathogenic avian influenza	...	...	
Japanese encephalitis	...	...	
Leishmaniosis	+	1 511	
Leptospirosis	+	12	
Listeriosis	+	3	
Marburg haemorrhagic fever	...	...	
Monkey pox	...	...	
New variant Creutzfeldt-Jakob disease	...	...	
New world screwworm (Cochliomyia hominivorax)	...	...	
Nipah virus encephalitis	...	...	
Old world screwworm (Chrysomya bezziana)	...	...	
Porcine cysticercosis	...	...	
Q fever	...	...	
Rabies	+	1	1
Rift Valley fever	...	...	
Salmonellosis	+	1 481	
Swine erysipelas	...	...	
Toxoplasmosis	...	...	
Trichinellosis	...	...	
Tularemia	+	89	
Venezuelan equine encephalomyelitis	...	...	
West Nile Fever	...	...	

6. Animal population

Species	Administrative region	Totals	Units	Number	Units
Birds	Whole country	677 500 000	Establishments	...	Animals
Buffaloes	Whole country	71 193	Establishments	...	Animals
Cats	Whole country	702 818	Establishments	...	Animals
Cattle	Whole country	10 411 226	Establishments	...	Animals
Dogs	Whole country	1 140 000	Establishments	...	Animals
Equidae	Whole country	547 259	Establishments	...	Animals
Goats	Whole country	6 021 194	Establishments	...	Animals
Sheep	Whole country	23 151 912	Establishments	...	Animals
Sheep / goats	Whole country	29 173 106	Establishments	...	Animals

7. Personnel

Veterinarians:

	Public administration	Both	Private accredited practitioners
Animal health activities	2148		...
Public Health activities (abattoirs, food hygiene, etc,)	1035		...

Laboratories	231		...
Academics or Training Institutions		...	
Private practitioners in the pharmaceutical industry		...	
Independent Private Veterinarians		4904	
Others		...	

Veterinary Paraprofessionals

	Public administration	Both	Private accredited practitioners
Animal health activities		2073	
'Community Animal Health workers'		...	
Involved in food hygiene, including the abattoirs		19	
Others		...	

8. National reference laboratories

Name of Laboratory	Contacts	Latitude	Longitude
Bornova Veterinary Control and Research Institute	Mr Necdet Akkoca	38.5715	26.9843
Etlik Central Veterinary Control and Research Institute	Dr. Nahit Yazicioglu	39.6506	33.3436
Foot and Mouth Disease Instıtute	Dr. Recep Ergül	39.8421	32.0667
Konya Veterinary Control and Research Institute	Dr. Adnan Oztürk	37.7798	32.7562
Pendik Veterinary Control and Research Institute	Dr. Muhammed Aksin	40.9914	29.2254

9. Diagnostic Tests

Name of Laboratory	Disease:	Test Type
Etlik Central Veterinary Control and Research Institute	African horse sickness	Antibody Detection ELISA
		Antigen (Ag) Detection ELISA
	Anthrax	Tissue Imprints
		Electron Microscopy
	Bluetongue	Virus Isolation
		Antibody Detection ELISA
		Antigen (Ag) Detection ELISA
		Agar-gel Immunodiffusion (AGID)
		Real-time PCR
	Bovine spongiform encephalopathy	Histopathological Examination
		Immunoperoxidase Monolayer Assay (IPMA)
	Bovine tuberculosis	Tuberculin Test
	Classical swine fever	Antibody Detection ELISA
		Antigen (Ag) Detection ELISA
	Dourine	Complement Fixation Test (CFT)
	Enzootic bovine leukosis	Antibody Detection ELISA
	Equine infectious anaemia	Antibody Detection ELISA
		Agar-gel Immunodiffusion (AGID)
	Equine viral arteritis	Virus Isolation
		Virus Neutralisation Test (VNT)
		Real-time PCR
	Glanders	Complement Fixation Test (CFT)
	Infectious bovine rhinotracheitis/infectious pustular vulvovaginitis	Virus Isolation
		Antibody Detection ELISA
		Antigen (Ag) Detection ELISA
		Real-time PCR
	Leptospirosis	Microscopic Agglutination Test (MAT)
		Indirect Fluorescent Antibody (IFA) Test
	Paratuberculosis	Enzyme-linked Immunosorbent Assay (ELISA)
	Peste des petits ruminants	Virus Isolation
		Agar-gel Immunodiffusion (AGID)
		Antibody Detection ELISA
		Antigen (Ag) Detection ELISA
		Real-time PCR
	Rabbit haemorrhagic disease	Rapid Tests
	Rabies	Real-time PCR
		Seller's Test
		Direct Fluorescent Antibody (FAT) Test
	Rinderpest	Virus Isolation

		Antibody Detection ELISA
		Antigen (Ag) Detection ELISA
		Agar-gel Immunodiffusion (AGID)
		Real-time PCR
	Varroosis of honey bees	Anatomo-pathological Examination
Bornova Veterinary Control and Research Institute	Bacterial kidney disease (Renibacterium salmoninarum)	Pathogen Isolation On Cell Culture
		Direct Fluorescent Antibody (FAT) Test
	Crayfish plague (Aphanomyces astaci)	Histological Test
		Pathogen Isolation On Cell Culture
	Epizootic haematopoietic necrosis	Pathogen Isolation On Cell Culture
		Indirect Fluorescent Antibody (IFA) Test
		Enzyme-linked Immunosorbent Assay (ELISA)
	Highly pathogenic avian influenza	Rapid Tests
		Real-time PCR
		Enzyme-linked Immunosorbent Assay (ELISA)
		Neuraminidase Inhibition Assay
		Agar-gel Immunodiffusion (AGID)
		Haemagglutination (HA) Test
		Haemagglutination Inhibition Test (HIT)
		Virus Isolation
	Infection with Bonamia ostreae	Histopathological Examination
	Infection with Marteilia refringens	Histopathological Examination
	Infectious pancreatic necrosis	Pathogen Isolation On Cell Culture
		Indirect Fluorescent Antibody (IFA) Test
		Enzyme-linked Immunosorbent Assay (ELISA)
	Spring viraemia of carp	Pathogen Isolation On Cell Culture
		Indirect Fluorescent Antibody (IFA) Test
		Enzyme-linked Immunosorbent Assay (ELISA)
	Viral haemorrhagic septicaemia	Pathogen Isolation On Cell Culture
		Indirect Fluorescent Antibody (IFA) Test
		Enzyme-linked Immunosorbent Assay (ELISA)
Pendik Veterinary Control and Research Institute	Bovine brucellosis	Complement Fixation Test (CFT)
		Rose Bengal Test (RBT)
	Caprine and ovine brucellosis (excluding B. ovis)	Complement Fixation Test (CFT)
		Rose Bengal Test (RBT)
	Contagious agalactia	Enzyme-linked Immunosorbent Assay (ELISA)
	Contagious bovine pleuropneumonia	Complement Fixation Test (CFT)
		Western Blotting
	Contagious caprine pleuropneumonia	Complement Fixation Test (CFT)
	Marek's disease	Polymerase Chain Reaction (PCR)
		Agar-gel Immunodiffusion (AGID)
	Sheep pox and goat pox	Virus Isolation
		Virus Neutralisation Test (VNT)
		Indirect Fluorescent Antibody (IFA) Test
		Pathogen Isolation On Cell Culture
	Theileriosis	Indirect Fluorescent Antibody (IFA) Test
Foot and Mouth Disease Instıtute	Foot and mouth disease	Complement Fixation Test (CFT)
		Indirect Sandwich ELISA
		Polymerase Chain Reaction (PCR)
		Nucleotide Sequencing
		Pathogen Isolation On Cell Culture
Konya Veterinary Control and Research Institute	Newcastle disease	Haemagglutination (HA) Test
		Haemagglutination Inhibition Test (HIT)
		Intracerebral Pathogenicity Index (ICPI) Test
		Pathogen Isolation By Egg Inoculation

10. Vaccine Manufacturers

Manufacturer	**Contacts**	**Year of start of activity**	**Year of cessation of activity**
		...	...
Adana Veterinary Control and Research Institute	Dr. Mehmet Tuzcu	2002	...

Akuakim Ltd.Sti.	Prof. Dr. Hasmet Cagirgan	2005	...
Bio-Vet Ltd. Sti.	Ms Canan Olgac Güclü	2001	...
Dollvet A.S.	Dr. Huseyin Zengin	2005	...
Elazig Veterinary Control and Research Institute	Mr. Ünal Kilinç	2002	...
Etlik Central Veterinary Control and Research Institute	Dr. Nahit Yazicioglu	1927	...
FMD Institute	Dr. Recep Ergül	1967	...
Konya Veterinary Control and Research Institute	Dr. Adnan Ozturk	2002	...
Pendik Veterinary Control and Research Institute	Dr. Muhammed Aksin	1960	...
Samsun Veterinary Control and Research Institute	Mr. Ismail Aydin	2002	...
Vetal A.S.	Mr. Abdullah Tutak	1991	...

11. Vaccines

Disease:	Vaccine type	Vaccine	Manufacturer	Year of start of production	Year of end of production (if production ended)
Anthrax	Live Attenuated Vaccine	Ant Etvac	Etlik Central Veterinary Control And Research Institute	1953	...
		Basilax	Vetal A.S.	1991	...
Bluetongue	Live Attenuated Vaccine	Blu-T4 Etvac	Etlik Central Veterinary Control And Research Institute	1978	...
Bovine brucellosis	Live Attenuated Vaccine	S19 Adult	Pendik Veterinary Control And Research Institute	1960	...
		S19 Young	Pendik Veterinary Control And Research Institute	1960	...
Caprine and ovine brucellosis (excluding B. ovis)	Live Attenuated Vaccine	Aborvac-R	Vetal A.S.	2004	...
		Aborvac-R Lamb	Vetal A.S.	2006	...
		Rev 1 Adult	Pendik Veterinary Control And Research Institute	1960	...
		Rev 1 Young	Pendik Veterinary Control And Research Institute	1960	...
Foot and mouth disease	Inactivated Vaccine	Aftovac (O1, A22, Asia1)	Vetal A.S.	1997	...
		Aftovac-oil	Vetal A.S.	1999	...
		Turvac-oil Bivalan	FMD Institute	2006	...
		Turvac-oil Trivalan	FMD Institute	2006	...
Peste des petits ruminants	Live Attenuated Vaccine	Pestdoll-S	Dollvet A.S.	2007	...
		Pest-S Etvac	Etlik Central Veterinary Control And Research Institute	2002	...
Rabies	Live Attenuated Vaccine	Rab Etvac	Etlik Central Veterinary Control And Research Institute	1968	...
Sheep pox and goat pox	Live Attenuated Vaccine	Penpox M	Pendik Veterinary Control And Research Institute	1978	...
		Pocvac	Bio-Vet Ltd. Sti.	2003	...
		Poxdoll	Dollvet A.S.	2007	...
		Poxvac	Vetal A.S.	1994	...

12. Vaccine production

Manufacturer	Vaccine	Doses produced	Doses exported
Bio-Vet Ltd. Sti.	Pocvac	1 400 000	0
Dollvet A.S.	Pestdoll-S	500 000	0
	Poxdoll	750 000	0
Etlik Central Veterinary Control and Research Institute	Ant Etvac	1 127 000	0
	Blu-T4 Etvac	400 000	0
	Pest-S Etvac	4 000 000	0
	Rab Etvac	240 600	0
FMD Institute	Turvac-oil trivalan	13 201 608	0
Pendik Veterinary Control and Research Institute	Rev 1 Adult	1 500 000	0
	Rev 1 Young	300 000	0
	S19 Adult	100 000	0
	S19 Young	200 000	0
Vetal A.S.	Aborvac-R	1 964 900	0
	Aborvac-R Lamb	10 255	0
	Aftovac (O1, A22, Asia1)	821 407	0
	Aftovac-oil	519 093	0

	Poxvac	1 634 000	0

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Annex 5-6. Uganda

ANNUAL REPORT ON THE NOTIFICATION OF THE ABSENCE OR PRESENCE OF ALL DISEASES		
OIE Reference: 638, 16012, 34247, 38865	Report period: Jan - Dec 2007	Country: Uganda, Republic of

Report Summary			
Animal Type	Terrestrial and Aquatic	Date of report	15/4/2008
Submitted	Report Submitted	Report period	Jan - Dec 2007
Name of Sender of the report		Address	
Position		Telephone	
Email		Fax	
Entered by			

1. Present Diseases

Multiple species

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Foot and mouth disease	+		2	2	bov	V Qf * Qi GSu	226	15				0	
					buf	GSu						0	
					cap								
					cml								
					o/c								
					ovi								
					sui								
					fau								
Echinococcosis/hydatidosis	+?		...	...	bov	GSu						0	
					buf								
					cap								
					cer								
					cml								
					equ								
					o/c								
					ovi								
					sui								
					fau								
Rabies	?		...	...	bov	* GSu V						0	
					buf								
					can	* V GSu						0	
					cap								
					cer								
					cml								
					equ								
					fel	* V GSu						0	
					lep								
					o/c								
					ovi								
					sui								
					fau								
Paratuberculosis	?		...	...	bov	GSu						0	
					buf								
					cap								
					o/c								
					ovi								
Blackleg	+		3	3	bov		72 542	352	0	0	0		0
Coccidiosis	+		2	2	avi		5 109	1 203	179	0	15		0
					bov								
					buf								
					can								
					cap								
					cml								
					equ								
					lep								

					o/c								
					ovi								
					sui								
					fau								
Distomatosis (liver fluke)	+		3	3	avi								
					bov			9 556	4	0	2		0
					buf								
					can								
					cap								
					cml								
					equ								
					o/c								
					ovi								
					fau								
Salmonellosis (S. abortusequi)	+		1	1	equ								
Brucellosis (Brucella abortus)	+		11	11	bov	Te GSu *	999	82				0	
					buf								
					cml								
					fau								
Brucellosis (Brucella melitensis)	+		5	5	cap	Te GSu *	82	44				0	
					o/c								
					ovi								
Brucellosis (Brucella suis)	?		...	...	sui								
					fau								

Cattle

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Contagious bov. pleuropneumonia	+		3	3	bov	V Te GSu Qi *	70	11				0	
					buf								
					cap								
					o/c								
					ovi								
Lumpy skin disease	?		...	...	bov	* T GSu V						0	
					buf								
					fau								
Bovine anaplasmosis	+		...	...	bov	T GSu						0	
					buf								
					fau								
Bovine babesiosis	+		...	...	bov	T GSu						0	
					buf								
					fau								
Bovine tuberculosis	?		...	...	bov	GSu						0	
					buf								
					cap								
					cer								
					cml								
					o/c								
					ovi								
					fau								
Theileriosis	+		...	...	bov	T GSu						0	
					buf								
					cap								
					o/c								
					ovi								
					fau								
Trypanosomosis	+		...	...	bov	T GSu						0	
					buf								
					cap								
					cml								
					o/c								
					ovi								
					fau								

Sheep/Goats

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Peste des petits ruminants	+		1	1	bov	Te Cr Z T Qi						0	
					cap	Te Cr T Qi Z						0	
					o/c	Z Cr T Qi Te	5 205	278	41	0	0	0	0
					ovi	Te Cr Z T Qi						0	
					sui	Z T Cr Qi Te						0	
					fau	Qi Cr T Te Z						0	
Foot-rot	+		1	1	bov			367	0	0	0		0
					cap								
					o/c								
					ovi								
Caseous lymphadenitis	+		4	4	cap								
					o/c			158	0	0	0		0
					ovi								
					fau								
Sheep mange	+		1	1	cap								
					cml								
					o/c		23	1	0	0	0		0
					ovi								

Swine

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
African swine fever	+		3	3	sui	GSu * Qi	27	8				0	
					fau								

Birds

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Newcastle disease	+		...	...	avi	T GSu V						0	
					fau								
Avian infectious bronchitis	?		...	...	avi	T GSu						0	
Avian infect. laryngotracheitis	?		...	...	avi	T GSu						0	
Fowl cholera	?		...	...	avi	V T GSu						0	
					fau								
Fowl typhoid	?		...	...	avi	T GSu V						0	
Infec bursal disease (Gumboro)	+		...	...	avi	V GSu T						0	

2. Absent Diseases

Multiple species

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Vesicular stomatitis	0000	bov	GSu	0
		buf		
		cap	GSu	0
		cml		
		equ		
		o/c	GSu	0
		ovi	GSu	0
		sui	GSu	0
		fau		
Rinderpest	1994	bov	TSu * Qf GSu M Te	0
		buf	GSu	0
		cap		
		o/c		
		ovi		
		fau		
Rift Valley fever	0000	bov	GSu * Cr Qi TSu Cn Te Qf	0
		buf	*	0
		cap	GSu * Cr Qi Qf Cn	0
		cml	GSu	0
		o/c	Qi GSu * Qf Cr Cn	0
		ovi	Cr GSu * Qf Cn Qi	0
		fau	Cn Qf Cr * Qi GSu	0
Bluetongue	1987	bov	GSu	0
		buf		
		cap		

		cml		
		o/c		
		ovi		
		fau		
Aujeszky's disease	0000	bov	GSu	0
		can		
		cap		
		o/c		
		ovi		
		sui		
		fau		
Trichinellosis	2001	equ		
		sui		
		fau		
Japanese encephalitis	-	equ		
		sui		
Tularemia	1998	lep		
		fau		
Crimean Congo haemorrhagic fever	0000	avi		
		bov		
		buf		
		can		
		cap		
		cer		
		cml		
		equ		
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		
West Nile Fever	0000	avi		
		bov		
		buf		
		can		
		cap		
		cer		
		cml		
		equ		
		fel		
		lep		
		o/c		
		ovi		
		sui		
		fau		
Cattle				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Bovine viral diarrhoea	0000	bov	GSu	0
		buf	GSu	0
Sheep/Goats				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Ovine epididymitis (B. ovis)	-	ovi	GSu	0
Contagious cap. pleuropneumonia	-	cap	GSu	0
Swine				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Swine vesicular disease	0000	sui	GSu	0
		fau		
Nipah virus encephalitis	0000	sui		
Equidae				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
African horse sickness	0000	equ	GSu	0
		fau		
Birds				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**

Highly path. avian influenza	0000	avi	TSu * GSu Qf Te	0
		fau		
Mycoplasmosis (M. gallisepticum)	-	avi	GSu	0
		fau		
Avian chlamydiosis	-	avi	GSu	0
Other				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Camelpox	0000	cml		

3. Detailed quantitative information for OIE-listed diseases/infections present in Uganda

Disease information by State by month from Report Year 2007

Foot and mouth disease

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Apr	KABERAMAIDO		1	1	bov	170	10				
May	KASESE		1	1	bov	56	5				

Peste des petits ruminants

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Apr	MOROTO		1	1	o/c	5 205	28	9	0	0	0
May	MOROTO		0	1	o/c	0					
Jun	MOROTO		0	1	o/c	0					
Jul	MOROTO		0	1	o/c	0	250	32			0
Aug	MOROTO		0	1	o/c	0					
Sep	MOROTO		0	1	o/c	0					
Oct	MOROTO		0	1	o/c	0					
Nov	MOROTO		0	1	o/c	0					
Dec	MOROTO		0	1	o/c	0					

Contagious bov. pleuropneumonia

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	WAKISO		1	1	bov	6	3				
Feb	KIRUHURA		1	1	bov	5	4				
Nov	KAMPALA		1	1	bov	59	4				

African swine fever

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Oct	MUKONO		1	1	sui	6	2				
	NAKASONGOLA		1	1	sui	10	2				
	WAKISO		1	1	sui	11	4				

Brucellosis (Brucella abortus)

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	LYANTONDE		1	1	bov	20	6				
	MBARARA		1	1	bov	10	1				
	MOROTO		1	1	bov	23	1				
	WAKISO		1	1	bov	6	3				
Feb	MPIGI		1	1	bov	10	2				
Mar	KAMPALA		1	1	bov	114	5				
Apr	WAKISO		1	1	bov	14	6				
Jun	KAMPALA		1	1	bov	62	14				
	MBARARA		1	1	bov	25	16				
Jul	KASESE		1	1	bov	700	22				
Sep	WAKISO		1	1	bov	15	6				

Brucellosis (Brucella melitensis)

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	MBARARA		1	1	cap	22	6				
	WAKISO		1	1	cap	10	5				
Apr	WAKISO		1	1	cap	9	8				
Jun	MBARARA		1	1	cap	21	13				
Aug	KIBAALE		1	1	cap	20	12				

Disease information for Report Year 2007

Foot and mouth disease

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		0	0		0					

Jun		0	0		0					

Peste des petits ruminants

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		0	0		0					
Feb		0	0		0					
Mar		0	0		0					

Contagious bov. pleuropneumonia

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Mar		0	0		0					
Apr		0	0		0					
May		0	0		0					
Jun		0	0		0					
Jul		0	0		0					
Aug		0	0		0					
Sep		0	0		0					
Oct		0	0		0					
Dec		0	0		0					

African swine fever

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul		0	0		0					
Aug		0	0		0					
Sep		0	0		0					
Nov		0	0		0					
Dec		0	0		0					

Brucellosis (Brucella abortus)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
May		0	0		0					
Aug		0	0		0					
Oct		0	0		0					
Nov		0	0		0					
Dec		0	0		0					

Brucellosis (Brucella melitensis)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Feb		0	0		0					
Mar		0	0		0					
May		0	0		0					
Jul		0	0		0					
Sep		0	0		0					
Oct		0	0		0					
Nov		0	0		0					
Dec		0	0		0					

Disease information for Report Year 2007

Blackleg

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	3	7	bov	72 542	352	0	0	0	0

Coccidiosis

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	2	8	avi	5 109	1 203	179	0	15	0

Distomatosis (liver fluke)

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	3	25	bov		9 556	4	0	2	0

Foot-rot

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	1	8	bov		367	0	0	0	0

Caseous lymphadenitis

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	4	4	o/c		158	0	0	0	0

Sheep mange

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	1	1	o/c	23	1	0	0	0	0

Salmonellosis (S. abortusequi)

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	1	2	bov	1 800	253	78	0	3	0

4. Unreported Diseases

Multiple species		
Anthrax	Heartwater	Leptospirosis
Q fever	N. w. screwworm (C. hominivorax)	O. w. screwworm (C. bezziana)
Listeriosis	Toxoplasmosis	Botulism
Other clostridial infections	Other pasteurelloses	Actinomycosis
Intestinal Salmonella infections	Filariosis	Enterotoxaemia
Brucellosis	Salmonellosis	
Cattle		
Bovine brucellosis	Bov. genital campylobacteriosis	Bovine cysticercosis
Dermatophilosis	Enzootic bovine leukosis	Haemorrhagic septicaemia
Inf.bov.rhinotracheit. (IBR/IPV)	Trichomonosis	Bovine spongiform encephalopathy
Mucosal disease/DVB	Warble infestation	
Sheep/Goats		
Sheep pox and goat pox	Caprine arthritis/encephalitis	Contagious agalactia
Enzootic abortion (chlamydiosis)	Ovine pulmonary adenomatosis	Nairobi sheep disease
Salmonellosis (S. abortusovis)	Scrapie	Maedi-visna
Contagious pustular dermatitis	Contagious ophthalmia	
Swine		
Classical swine fever	Atrophic rhinitis of swine	Porcine cysticercosis
Transmissible gastroenteritis	Enterovirus encephalomyelitis	Porcine reproductive/respiratory syndr.
Melioidosis	Vibrionic dysentery	Swine erysipelas
Equidae		
Contagious equine metritis	Dourine	Epizootic lymphangitis
Equine infectious anaemia	Equine influenza	Equine piroplasmosis
Equine rhinopneumonitis	Glanders	Horse pox
Equine viral arteritis	Horse mange	Surra (Trypanosoma evansi)
Venezuelan equ.encephalomyelitis	Equine coital exanthema	Ulcerative lymphangitis
Strangles	Encephalomyelitis (East.)	Encephalomyelitis (West.)
Lagomorphs		
Myxomatosis	Rabbit haemorrhagic disease	
Birds		
Avian tuberculosis	Duck virus hepatitis	Duck virus enteritis
Fowl pox	Marek's disease	Pullorum disease
Infectious coryza	Avian encephalomyelitis	Avian spirochaetosis
Other avian salmonellosis	Avian leukosis	Turkey rhinotracheitis
Avian mycoplasmosis (M.synoviae)	Low pathogenic avian influenza (poultry)	
Bees		
Acarapisosis of honey bees	American foulbrood of honey bees	European foulbrood of honey bees
Varroosis of honey bees	Tropilaelaps infestation of honey bees	Small hive beetle infestation
Other		
Leishmaniosis		
Fish		
Viral haemorrhagic septicaemia	Spring viraemia of carp	Infect. haematopoietic necrosis
Epizoot. haematopoietic necrosis	Infectious salmon anaemia	Epizootic ulcerative syndrome
Gyrodactylosis (Gyrodactylus salaris)	Red sea bream iridoviral disease	Koi herpesvirus disease
Molluscs		
Infection with Bonamia ostreae	Infection with Bonamia exitiosa	Infection with Marteilia refringens
Infection with Perkinsus marinus	Abalone viral mortality	
Crustaceans		
Taura syndrome	White spot disease	Yellow head disease
Spherical baculovirosis (Penaeus monodon-type baculovirus)	Tetrahedral baculovirosis (Baculovirus penaei)	Infectious hypodermal and haematopoietic necrosis
Crayfish plague (Aphanomyces astaci)		

5. Zoonoses in Humans

Disease Name	**Present diseases**	**Cases**	**Deaths**
Anthrax	...	...	
Avian chlamydiosis	...	...	
Botulism	...	...	
Bovine cysticercosis	...	...	
Bovine tuberculosis	+(?)	+(?)	
Brucellosis	+(?)	+(?)	
Campylobacteriosis	...	...	
Crimean Congo haemorrhagic fever	...	...	
Ebola haemorrhagic fever	+(?)	+(?)	
Echinococcosis/hydatidosis	...	...	

Escherichia coli O157	...	...	
Glanders	...	...	
Hantavirus pulmonary syndrome	...	...	
Highly pathogenic avian influenza	...	...	
Japanese encephalitis	...	...	
Leishmaniosis	...	...	
Leptospirosis	...	...	
Listeriosis	...	...	
Marburg haemorrhagic fever	+(?)	+(?)	
Monkey pox	...	...	
New variant Creutzfeldt-Jakob disease	...	...	
New world screwworm (Cochliomyia hominivorax)	...	...	
Nipah virus encephalitis	...	...	
Old world screwworm (Chrysomya bezziana)	...	...	
Porcine cysticercosis	...	...	
Q fever	...	...	
Rabies	+(?)	+(?)	
Rift Valley fever	...	...	
Salmonellosis	...	...	
Swine erysipelas	...	...	
Toxoplasmosis	...	...	
Trichinellosis	...	...	
Tularemia	...	...	
Venezuelan equine encephalomyelitis	...	...	
West Nile Fever	...	...	

6. Animal population

Species	Administrative region	Totals	Units	Number	Units
Birds	ADJUMANI	142 272	Establishments	...	Animals
	BUGIRI	244 137	Establishments	...	Animals
	BUSIA	196 850	Establishments	...	Animals
	IGANGA	548 308	Establishments	...	Animals
	JINJA	278 495	Establishments	...	Animals
	KABERAMAIDO	89 197	Establishments	...	Animals
	KALANGALA	250 162	Establishments	...	Animals
	KAMPALA	121 533	Establishments	...	Animals
	KAMULI	578 193	Establishments	...	Animals
	KAMWENGE	109 572	Establishments	...	Animals
	KANUNGU	74 693	Establishments	...	Animals
	KAPCHORWA	75 550	Establishments	...	Animals
	KASESE	73 171	Establishments	...	Animals
	KATAKWI	130 416	Establishments	...	Animals
	KAYUNGA	135 561	Establishments	...	Animals
	KIBOGA	346 599	Establishments	...	Animals
	KITGUM	147 555	Establishments	...	Animals
	KOTIDO	21 341	Establishments	...	Animals
	KYENJOJO	177 840	Establishments	...	Animals
	LIRA	193 716	Establishments	...	Animals
	MASAKA	460 713	Establishments	...	Animals
	MASINDI	596 001	Establishments	...	Animals
	MAYUGE	157 264	Establishments	...	Animals
	MBALE	627 470	Establishments	...	Animals
	MOYO	98 081	Establishments	...	Animals
	MPIGI	801 479	Establishments	...	Animals
	MUBENDE	651 029	Establishments	...	Animals
	NAKAPIRIPIRIT	100 539	Establishments	...	Animals
	NTUNGAMO	35 568	Establishments	...	Animals
	PADER	34 899	Establishments	...	Animals
	PALISSA	300 566	Establishments	...	Animals
	SEMBABULE	138 122	Establishments	...	Animals
	SIRONKO	43 821	Establishments	...	Animals
	SOROTI	65 406	Establishments	...	Animals
	TORORO	507 621	Establishments	...	Animals
Cattle	ADJUMANI	42 390	Establishments	...	Animals
	APAC	68 172	Establishments	...	Animals
	ARUA	158 278	Establishments	...	Animals
	BUGIRI	40 740	Establishments	...	Animals

	BUNDIBUGYO	177 840	Establishments	...	Animals
	BUSHENYI	191 211	Establishments	...	Animals
	BUSIA	17 334	Establishments	...	Animals
	GULU	13 042	Establishments	...	Animals
	HOIMA	154 128	Establishments	...	Animals
	IGANGA	98 820	Establishments	...	Animals
	JINJA	19 370	Establishments	...	Animals
	KABALE	80 647	Establishments	...	Animals
	KABAROLE	66 749	Establishments	...	Animals
	KABERAMAIDO	34 783	Establishments	...	Animals
	KALANGALA	3 580	Establishments	...	Animals
	KAMPALA	4 380	Establishments	...	Animals
	KAMULI	193 314	Establishments	...	Animals
	KAMWENGE	82 992	Establishments	...	Animals
	KANUNGU	35 568	Establishments	...	Animals
	KAPCHORWA	62 837	Establishments	...	Animals
	KASESE	65 208	Establishments	...	Animals
	KATAKWI	64 022	Establishments	...	Animals
	KAYUNGA	65 732	Establishments	...	Animals
	KIBOGA	207 480	Establishments	...	Animals
	KISORO	34 382	Establishments	...	Animals
	KITGUM	17 369	Establishments	...	Animals
	KOTIDO	663 936	Establishments	...	Animals
	KUMI	130 416	Establishments	...	Animals
	KYENJOJO	142 272	Establishments	...	Animals
	LIRA	39 868	Establishments	...	Animals
	LUWERO	243 048	Establishments	...	Animals
	MASAKA	200 160	Establishments	...	Animals
	MASINDI	99 590	Establishments	...	Animals
	MAYUGE	18 773	Establishments	...	Animals
	MBALE	118 889	Establishments	...	Animals
	MBARARA	956 779	Establishments	...	Animals
	MOROTO	969 923	Establishments	...	Animals
	MOYO	37 581	Establishments	...	Animals
	MPIGI	241 363	Establishments	...	Animals
	MUBENDE	79 435	Establishments	...	Animals
	MUKONO	72 143	Establishments	...	Animals
	NAKAPIRIPIRIT	235 788	Establishments	...	Animals
	NAKASONGOLA	183 768	Establishments	...	Animals
	NEBBI	163 613	Establishments	...	Animals
	NTUNGAMO	296 400	Establishments	...	Animals
	PADER	35 568	Establishments	...	Animals
	PALISSA	121 906	Establishments	...	Animals
	RAKAI	231 792	Establishments	...	Animals
	RUKUNGIRI	77 064	Establishments	...	Animals
	SEMBABULE	205 109	Establishments	...	Animals
	SIRONKO	35 568	Establishments	...	Animals
	SOROTI	71 136	Establishments	...	Animals
	TORORO	188 713	Establishments	...	Animals
	WAKISO	42 390	Establishments	...	Animals
	YUMBE	68 172	Establishments	...	Animals
Equidae	BUGIRI	17	Establishments	...	Animals
	BUSIA	16	Establishments	...	Animals
	IGANGA	16	Establishments	...	Animals
	JINJA	90	Establishments	...	Animals
	KAMULI	32	Establishments	...	Animals
	KASESE	36	Establishments	...	Animals
	KITGUM	328	Establishments	...	Animals
	LIRA	22	Establishments	...	Animals
	MAYUGE	5	Establishments	...	Animals
	MBALE	499	Establishments	...	Animals
	MUKONO	73	Establishments	...	Animals
	PADER	3	Establishments	...	Animals
	PALISSA	7	Establishments	...	Animals
	TORORO	20	Establishments	...	Animals
Goats	ADJUMANI	94 848	Establishments	...	Animals

	BUGIRI	72 093	Establishments	...	Animals
	BUNDIBUGYO	39 053	Establishments	...	Animals
	BUSIA	37 414	Establishments	...	Animals
	IGANGA	11 095	Establishments	...	Animals
	JINJA	50 031	Establishments	...	Animals
	KABERAMAIDO	61 824	Establishments	...	Animals
	KALANGALA	3 438	Establishments	...	Animals
	KAMPALA	2 540	Establishments	...	Animals
	KAMULI	167 232	Establishments	...	Animals
	KAMWENGE	65 532	Establishments	...	Animals
	KANUNGU	25 205	Establishments	...	Animals
	KAPCHORWA	15 066	Establishments	...	Animals
	KASESE	30 482	Establishments	...	Animals
	KATAKWI	106 704	Establishments	...	Animals
	KAYUNGA	37 263	Establishments	...	Animals
	KIBOGA	104 309	Establishments	...	Animals
	KITGUM	26 170	Establishments	...	Animals
	KOTIDO	118 560	Establishments	...	Animals
	KYENJOJO	29 640	Establishments	...	Animals
	LIRA	128 589	Establishments	...	Animals
	LUWERO	97 241	Establishments	...	Animals
	MASAKA	206 915	Establishments	...	Animals
	MASINDI	373 227	Establishments	...	Animals
	MAYUGE	38 232	Establishments	...	Animals
	MBALE	10 954	Establishments	...	Animals
	MOYO	83 150	Establishments	...	Animals
	MPIGI	35 016	Establishments	...	Animals
	MUKONO	66 051	Establishments	...	Animals
	NAKAPIRIPIRIT	302 784	Establishments	...	Animals
	NTUNGAMO	22 764	Establishments	...	Animals
	PADER	5 987	Establishments	...	Animals
	PALISSA	12 991	Establishments	...	Animals
	SEMBABULE	139 308	Establishments	...	Animals
	SIRONKO	38 217	Establishments	...	Animals
	SOROTI	80 475	Establishments	...	Animals
	TORORO	104 344	Establishments	...	Animals
	YUMBE	77 341	Establishments	...	Animals
Hares / rabbits	BUGIRI	3 395	Establishments	...	Animals
	BUNDIBUGYO	2 166	Establishments	...	Animals
	IGANGA	7 747	Establishments	...	Animals
	JINJA	5 132	Establishments	...	Animals
	KAMPALA	774	Establishments	...	Animals
	KAMULI	5 112	Establishments	...	Animals
	KAMWENGE	2 638	Establishments	...	Animals
	KANUNGU	1 219	Establishments	...	Animals
	KASESE	7 928	Establishments	...	Animals
	KAYUNGA	2 853	Establishments	...	Animals
	KIBOGA	474	Establishments	...	Animals
	KITGUM	1 315	Establishments	...	Animals
	KYENJOJO	1 186	Establishments	...	Animals
	LIRA	145	Establishments	...	Animals
	MASAKA	7 438	Establishments	...	Animals
	MASINDI	4 541	Establishments	...	Animals
	MAYUGE	10 927	Establishments	...	Animals
	MBALE	13 328	Establishments	...	Animals
	MOYO	661	Establishments	...	Animals
	MUKONO	8 536	Establishments	...	Animals
	NAKAPIRIPIRIT	124	Establishments	...	Animals
	NAKASONGOLA	2 371	Establishments	...	Animals
	PADER	226	Establishments	...	Animals
	PALISSA	7 262	Establishments	...	Animals
Sheep	ADJUMANI	11 263	Establishments	...	Animals
	BUGIRI	8 816	Establishments	...	Animals
	BUNDIBUGYO	1 295	Establishments	...	Animals
	BUSHENYI	28 395	Establishments	...	Animals
	BUSIA	2 908	Establishments	...	Animals

	IGANGA	6 697	Establishments	...	Animals
	JINJA	1 602	Establishments	...	Animals
	KABERAMAIDO	19 760	Establishments	...	Animals
	KAMPALA	246	Establishments	...	Animals
	KAMULI	6 119	Establishments	...	Animals
	KAMWENGE	12 296	Establishments	...	Animals
	KANUNGU	3 730	Establishments	...	Animals
	KAPCHORWA	4 749	Establishments	...	Animals
	KASESE	3 468	Establishments	...	Animals
	KATAKWI	35 568	Establishments	...	Animals
	KAYUNGA	6 137	Establishments	...	Animals
	KIBOGA	30 696	Establishments	...	Animals
	KITGUM	5 180	Establishments	...	Animals
	KOTIDO	177 840	Establishments	...	Animals
	KYENJOJO	11 856	Establishments	...	Animals
	LIRA	19 039	Establishments	...	Animals
	LUWERO	40 309	Establishments	...	Animals
	MASAKA	10 440	Establishments	...	Animals
	MASINDI	69 002	Establishments	...	Animals
	MAYUGE	2 363	Establishments	...	Animals
	MBALE	14 232	Establishments	...	Animals
	MOYO	15 018	Establishments	...	Animals
	MPIGI	12 315	Establishments	...	Animals
	MUKONO	8 334	Establishments	...	Animals
	NAKAPIRIPIRIT	155 770	Establishments	...	Animals
	NTUNGAMO	11 979	Establishments	...	Animals
	PADER	593	Establishments	...	Animals
	PALISSA	17 963	Establishments	...	Animals
	SEMBABULE	14 168	Establishments	...	Animals
	SIRONKO	7 882	Establishments	...	Animals
	SOROTI	56 372	Establishments	...	Animals
	TORORO	17 855	Establishments	...	Animals
	YUMBE	15 360	Establishments	...	Animals
Sheep / goats	Whole country	3 789 700	Establishments	...	Animals
Swine	ADJUMANI	15 413	Establishments	...	Animals
	ARUA	12 310	Establishments	...	Animals
	BUGIRI	9 200	Establishments	...	Animals
	BUSHENYI	11 856	Establishments	...	Animals
	BUSIA	8 391	Establishments	...	Animals
	GULU	8 299	Establishments	...	Animals
	HOIMA	36 756	Establishments	...	Animals
	IGANGA	14 156	Establishments	...	Animals
	JINJA	11 856	Establishments	...	Animals
	KABALE	14 227	Establishments	...	Animals
	KABAROLE	7 114	Establishments	...	Animals
	KABERAMAIDO	11 690	Establishments	...	Animals
	KALANGALA	8 564	Establishments	...	Animals
	KAMPALA	3 076	Establishments	...	Animals
	KAMULI	33 315	Establishments	...	Animals
	KAMWENGE	5 928	Establishments	...	Animals
	KANUNGU	4 742	Establishments	...	Animals
	KAPCHORWA	1 186	Establishments	...	Animals
	KASESE	27 269	Establishments	...	Animals
	KATAKWI	20 155	Establishments	...	Animals
	KAYUNGA	12 942	Establishments	...	Animals
	KIBOGA	21 341	Establishments	...	Animals
	KISORO	3 557	Establishments	...	Animals
	KITGUM	11 823	Establishments	...	Animals
	KOTIDO	1 186	Establishments	...	Animals
	KYENJOJO	2 371	Establishments	...	Animals
	LIRA	9 724	Establishments	...	Animals
	LUWERO	30 826	Establishments	...	Animals
	MASAKA	85 922	Establishments	...	Animals
	MASINDI	35 568	Establishments	...	Animals
	MAYUGE	7 114	Establishments	...	Animals
	MBALE	23 690	Establishments	...	Animals

Annex 5-7. Vietnam

WAHID Interface
Animal Health Information
Information zoosanitaire
Información Zoosanitaria

ANNUAL REPORT ON THE NOTIFICATION OF THE ABSENCE OR PRESENCE OF ALL DISEASES		
OIE Reference: 652, 14305, 38872, 38879	Report period: Jan - Dec 2007	Country: Vietnam, Socialist Republic of

Report Summary			
Animal Type	Terrestrial and Aquatic	Date of report	28/4/2008
Submitted	Report Submitted	Report period	Jan - Dec 2007
Name of Sender of the report	Bui Quang Anh	Address	15/78 Giai Phong Road, HANOI
Position	Chief Veterinary Officer	Telephone	(84-4) 8696788
Email	dah.vn@fpt.vn	Fax	(84-4) 8686339
Entered by	Bui Quang Anh (VNM)		

1. Present Diseases

Multiple species

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Foot and mouth disease	+	A O Asia 1	119	150	bov	Z T Qf * V M Qi Sp TSu	4 290	2 300	0	848	0	0	119 390
					buf	Qi Sp M * TSu V Qf Z T	6 056	2 640	1	315	20	0	19 860
					cap	* Z Qf GSu M Qi Sp						0	
					cml	M Qf Qi Sp Z GSu *						0	
					o/c	M Qf * Qi Sp Z						0	
					ovi	Qf * M Qi Sp Z GSu						0	
					sui	M TSu * Qi Sp Z GSu Qf	9 090	3 867	24	3 114	183	0	17 978
					fau	Qi Sp						0	
Anthrax	+()		3	3	bov	Sp TSu GSu Qf						0	
					buf	GSu Qf Sp TSu	61	11	6	7	0	0	1 789
					cap								
					cml								
					equ	Qf GSu						0	
					o/c								
					ovi								
					sui								
					fau								
Aujeszky's disease	?		...	...	bov								
					can								
					cap								
					o/c								
					ovi								
					sui	Qf GSu						0	
					fau								
Heartwater	?		...	...	bov	Qf GSu						0	
					buf	GSu Qf						0	
					cap								
					o/c	GSu Qf						0	
					ovi	GSu Qf						0	
					fau								
Leptospirosis	+		184	188	bov	GSu Qf						0	
					buf	Qf GSu						0	
					can								
					cap								
					cer								
					equ								
					o/c								

					ovi								
					sui	GSu Qf	5 368	1 521	491	371	0	0	2 100
Rabies	+()		23	23	bov	*						0	
					buf	*						0	
					can	V TSu *	2 719	343	343	0	1	0	663 000
					cap	*						0	
					cer	*						0	
					cml	*						0	
					equ	*						0	
					fel	V * TSu						0	
					lep	*						0	
					o/c	*						0	
					ovi	*						0	
					sui	*						0	
					fau								
Paratuberculosis	?		...	...	bov	GSu						0	
					buf	GSu						0	
					cap								
					o/c								
					ovi								
Listeriosis	?		...	...	avi								
					bov	T GSu						0	
					buf	T GSu						0	
					cap								
					equ								
					o/c								
					ovi								
					sui								
Toxoplasmosis	?		...	...	bov	T GSu						0	
					buf	T GSu						0	
					can								
					cap	T GSu						0	
					fel								
					o/c								
					ovi								
					sui								
					fau								
Blackleg	+()		35	35	bov	T GSu						0	
Botulism	?		...	...	avi								
					bov	T GSu						0	
					cap								
					equ								
					o/c								
					ovi								
					sui								
					fau								
Coccidiosis	?		...	...	avi	T GSu						0	
					bov	T GSu						0	
					buf								
					can								
					cap								
					cml								
					equ								
					lep								
					o/c								
					ovi								
					sui								
					fau								
Distomatosis (liver fluke)	+		...	...	avi								
					bov	T GSu						0	
					buf	GSu T						0	
					can								

					cap								
					cml								
					equ								
					o/c								
					ovi								
					fau								
Filariosis	?		...	...	bov	GSu						0	
					can								
					equ								
					fel								
					ovi								
					sui								
					fau								
Enterotoxaemia	?		...	...	bov	GSu						0	
					cap								
					cml								
					o/c								
					ovi								
					fau								
Salmonellosis (S. abortusequi)	?		...	...	equ	T GSu						0	
Brucellosis (Brucella abortus)	?		...	...	bov								
					buf								
					cml								
					fau								

Cattle

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Lumpy skin disease	+?		38	39	bov	Qi Sp M GSu Qf						0	
					buf	GSu Qi Sp M Qf	1 412	290	61	84	0	0	1 200
					fau								
Bovine anaplasmosis	?		...	...	bov	GSu						0	
					buf								
					fau								
Bovine babesiosis	?		...	...	bov	GSu						0	
					buf								
					fau								
Bov. genital campylobacteriosis	?		...	...	bov	GSu						0	
					buf								
					ovi								
					fau								
Bovine tuberculosis	?		...	...	bov	GSu						0	
					buf								
					cap								
					cer								
					cml								
					o/c								
					ovi								
					fau								
Enzootic bovine leukosis	?		...	...	bov	GSu						0	
Haemorrhagic septicaemia	+		1 673	1 754	bov	GSu TSu V M Qi	124 130	31 964	2 775	0	0	0	194 510
					buf	TSu V M Qi	75 301	12 092	938	12	9	0	149 200
Inf.bov.rhinotracheit. (IBR/IPV)	?		...	...	bov	GSu						0	
Theileriosis	?		...	...	bov	GSu						0	
					buf	GSu						0	
					cap	GSu						0	
					o/c								
					ovi								

					fau								
Trichomonosis	?		...	...	bov	GSu						0	
Trypanosomosis	+		...	...	bov	GSu						0	
					buf	GSu						0	
					cap								
					cml								
					o/c								
					ovi								
					fau								

Sheep/Goats

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Sheep pox and goat pox	+		1	1	cap	M Qi Sp Qf T * GSu	50	5	1	0	0	0	1 000
					o/c	* GSu Qf T Qi Sp						0	
					ovi	Qf Qi Sp * T GSu						0	
					fau	T * Qi Sp						0	
Salmonellosis (S. abortusovis)	?		...	...	ovi	GSu						0	

Swine

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Classical swine fever	+		337	361	sui	Z V * TSu M Qi	42 543	6 935	3 286	2 248	0	0	144 100
					fau								
Porcine cysticercosis	+()		...	...	sui	GSu						0	
Porcine reproductive/respiratory syndr.	+		79	79	sui	GSu Qi Sp	50 985	29 720	6 329	3 635	790	0	0

Equidae

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Surra (Trypanosoma evansi)	+		45	46	bov	Qf						0	
					buf		1 476	233	32	10	0		3 700
					cml								
					equ								

Birds

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Highly path. avian influenza	+	H5N1	73	73	avi	Qf Qi Sp TSu * Te Cr Z V S	88 313	30 798	22 978	56 520	0	125 000 000	2 070 000
					fau	Te Qi Sp TSu * S Cr Z Qf						0	
Newcastle disease	+		1 174	1 351	avi	V Qf * GSu	1 109 090	1 069 351	81 874	14 682	0	12 000 000	1 497 000
					fau	*						0	
Avian infectious bronchitis	+		...	...	avi	GSu M						0	
Duck virus hepatitis	+		16	42	avi	GSu M	16 268	5 779	2 034	1 000	0	0	14 000
Fowl cholera	+		...	...	avi	M GSu						0	
					fau								
Fowl typhoid	+		...	...	avi	GSu M						0	
Infec bursal disease (Gumboro)	+		...	...	avi	V M GSu						7 200 000	
Pullorum disease	+		...	...	avi	GSu V M						4 600 000	

Fish

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
Epizootic ulcerative syndrome	+()		...	...	pis	Qf GSu *						0	
					fau								

Crustaceans

Disease Name	Present diseases	Serotypes	New outbreaks	Total outbreaks	Species	Control Measures	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Routine Vaccinated	Ring vaccinated
White spot disease	+		...	...	cru	Qi Qf GSu M *						0	
					fau								

Yellow head disease	+()		...	...	cru	* GSu Qf Qi M						0	
					fau								
Spherical baculovirosis (Penaeus monodon-type baculovirus)	+		...	...	cru	GSu Qf						0	
					fau								

2. Absent Diseases

Multiple species

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Vesicular stomatitis	0000	bov	GSu Qf	0
		buf		
		cap		
		cml		
		equ		
		o/c		
		ovi		
		sui	Qf GSu	0
		fau		
Rinderpest	1977	bov	Vp Qf GSu	0
		buf	Vp GSu Qf	0
		cap	Vp Qf GSu	0
		o/c	Qf Vp GSu	0
		ovi	Qf GSu Vp	0
		fau	Vp GSu Qf	0
Rift Valley fever	0000	bov	GSu Qf	0
		buf	Qf GSu	0
		cap	GSu Qf	0
		cml		
		o/c	GSu Qf	0
		ovi	GSu Qf	0
		fau		
Bluetongue	0000	bov	Qf GSu	0
		buf	Qf GSu	0
		cap	Qf GSu	0
		cml	Qf GSu	0
		o/c	GSu Qf	0
		ovi	GSu Qf	0
		fau		
N. w. screwworm (C. hominivorax)	0000	avi		
		bov	GSu Qf	0
		buf		
		can	GSu Qf	0
		cap		
		cml		
		equ		
		fel	Qf GSu	0
		lep		
		o/c		
		ovi		
		sui		
		fau		
O. w. screwworm (C. bezziana)	0000	avi		
		bov		
		buf		
		can	GSu Qf	0
		cap		
		cml		
		equ		
		fel	GSu Qf	0
		lep		
		o/c		
		ovi		

		sui		
		fau		
Trichinellosis	1991	equ		
		sui	Qf GSu	0
		fau		
Cattle				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Contagious bov. pleuropneumonia	0000	bov	Qf GSu	0
		buf	GSu Qf	0
		cap	Qf GSu	0
		o/c	Qf GSu	0
		ovi	GSu Qf	0
Bovine spongiform encephalopathy	0000	bov	Qf GSu	0
Sheep/Goats				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Peste des petits ruminants	0000	bov		
		cap		
		o/c	GSu Qf Vp	0
		ovi		
		sui		
		fau		
Ovine epididymitis (B. ovis)	0000	ovi	Qf GSu	0
Caprine arthritis/encephalitis	0000	cap	Qf GSu	0
Contagious agalactia	0000	cap		
		o/c	GSu Qf	0
		ovi		
Contagious cap. pleuropneumonia	0000	cap	Qf GSu Vp	0
Enzootic abortion (chlamydiosis)	0000	cap		
		o/c	GSu Qf	0
		ovi		
Nairobi sheep disease	0000	cap		
		o/c	GSu Qf	0
		ovi		
Scrapie	0000	cap		
		o/c	Qf GSu	0
		ovi		
Maedi-visna	0000	ovi	Qf	0
Swine				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Swine vesicular disease	0000	sui	Qf Vp GSu	0
		fau		
African swine fever	0000	sui	GSu Qf	0
		fau		
Transmissible gastroenteritis	0000	sui	Qf	0
Equidae				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
African horse sickness	0000	equ	Qf Vp * GSu	0
		fau		
Contagious equine metritis	-	equ	Qf	0
Dourine	-	equ	Qf	0
Equine infectious anaemia	-	equ	Qf	0
Equine influenza	-	equ	* Qf GSu	0
Equine piroplasmosis	-	equ	Qf	0
Equine rhinopneumonitis	-	equ	Qf	0
Glanders	-	equ	Qf	0
Equine viral arteritis	0000	equ	Qf	0
Venezuelan equ.encephalomyelitis	0000	equ	GSu Qf *	0
Lagomorphs				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**
Rabbit haemorrhagic disease	-	lep	Qf GSu	0
		fau		
Fish				
Disease Name	**Last occurrence**	**Species**	**Control Measures**	**Routine Vaccinated**

Viral haemorrhagic septicaemia	0000	pis	Qf * GSu	0
		fau		
Spring viraemia of carp	0000	pis	Qf GSu *	0
		fau		
Infect. haematopoietic necrosis	0000	pis	GSu * Qf	0
		fau		
Epizoot. haematopoietic necrosis	0000	pis	GSu Qf *	0
		fau		
Infectious salmon anaemia	0000	pis	* Qf GSu	0
		fau		
Gyrodactylosis (Gyrodactylus salaris)	0000	pis	Qf GSu *	0
		fau		
Red sea bream iridoviral disease	0000	pis	GSu * Qf	0
		fau		
Koi herpesvirus disease	0000	pis		

Molluscs

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Infection with Bonamia ostreae	0000	mol	* Qf GSu	0
		fau		
Infection with Bonamia exitiosa	0000	mol	Qf GSu *	0
		fau		
Infection with Marteilia refringens	0000	mol	GSu * Qf	0
		fau		
Infection with Perkinsus marinus	0000	mol	GSu * Qf	0
		fau		
Abalone viral mortality	0000	mol	GSu * Qf	0

Crustaceans

Disease Name	Last occurrence	Species	Control Measures	Routine Vaccinated
Taura syndrome	0000	cru	* Qf GSu	0
		fau		
Tetrahedral baculovirosis (Baculovirus penaei)	0000	cru	Qf * GSu	0
		fau		
Infectious hypodermal and haematopoietic necrosis	0000	cru	* Qf GSu	0
		fau		
Crayfish plague (Aphanomyces astaci)	0000	cru	* GSu Qf	0
		fau		

3. Detailed quantitative information for OIE-listed diseases/infections present in Vietnam

Disease information by State by month from Report Year 2007

Foot and mouth disease

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul	CAN THO CITY	O	1	1	sui	3	3	0	3	0	2 500
	QUANG TRI	Asia 1	0	15	bov	0					
Aug	CAN THO CITY	O	8	8	sui	200	200	0	200	0	5 100
	QUANG TRI	Asia 1	0	15	bov	0					
Sep	QUANG TRI	Asia 1	0	15	bov	0					
Oct	QUANG TRI	Asia 1	0	15	bov	0					
Nov	NGHE AN	O	2	2	bov	35	23	0	23	0	2 100
	QUANG TRI	Asia 1	0	15	bov	0					
Dec	HA TINH	O	2	2	bov	30	27	0	27	0	4 200
					buf	2	2	0	2	0	1 000
	NGHE AN	O	3	3	bov	31	29	0	29	0	490
					buf	6	2	0	2	0	550
					sui	10	3	0	3	0	278
	QUANG TRI	Asia 1	0	15	bov	0					

Sheep pox and goat pox

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Oct	CAO BANG		1	1	cap	50	5	1	0	0	1 000

Highly path. avian influenza

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	BAC LIEU	H5N1	8	8	avi	5 126	2 280	1 080	3 445	0	
	CA MAU	H5N1	4	4	avi	194	34	29	139	0	
	KIEN GIANG	H5N1	4	4	avi	4 950	587	351	3 928	0	
	SOC TRANG	H5N1	2	2	avi	220	74	60	146	0	
	TRA VINH	H5N1	1	1	avi	1 500	880	210	320	0	
	VINH LONG	H5N1	1	1	avi	40	20	10	10	0	
Feb	HA TAY	H5N1	1	1	avi	600	50	50	550	0	
	HAI DUONG	H5N1	1	1	avi	10 500	6 000	5 500	4 500	0	
Mar	CA MAU	H5N1	1	1	avi	85	70	65	20	0	570 000
	CAN THO CITY	H5N1	1	1	avi	600	200	148	452	0	
	HA NOI CITY	H5N1	1	1	avi	2 450	1 500	1 150	1 300	0	
May	BAC NINH	H5N1	1	1	avi	950	750	570	380	0	
	HA NAM	H5N1	1	1	avi	230	230	180	50	0	
	HUNG YEN	H5N1	1	1	avi	300	180	125	175	0	
	NINH BINH	H5N1	1	1	avi	1 959	300	248	1 711	0	
	QUANG NINH	H5N1	3	3	avi	1 656	1 070	914	742	0	1 200 000
	SON LA	H5N1	1	1	avi	960	210	130	830	0	300 000
	THAI BINH	H5N1	1	1	avi	770	90	10	760	0	
	VINH PHUC	H5N1	1	1	avi	7 460	3 100	1 110	6 350	0	
Jun	BAC GIANG	H5N1	1	1	avi	719	227	227	492	0	
	CAO BANG	H5N1	1	1	avi	152	84	84	68	0	
	HA TINH	H5N1	1	1	avi	2 500	350	350	2 150	0	
	HAI PHONG CITY	H5N1	1	1	avi	660	126	126	534	0	
	NGHE AN	H5N1	1	1	avi	1 256	800	800	456	0	
	NINH BINH	H5N1	1	1	avi	2 250	275	275	1 975	0	
	PHU THO	H5N1	1	1	avi	370	320	240	130	0	
	QUANG NAM	H5N1	1	1	avi	300	175	95	205	0	
	QUANG NINH	H5N1	1	1	avi	200	70	70	130	0	
	THAI BINH	H5N1	1	1	avi	1 105	985	900	205	0	
	VINH PHUC	H5N1	1	1	avi	940	720	720	220	0	
Jul	DONG THAP	H5N1	2	2	avi	2 650	595	404	1 877	0	
	LAI CHAU	H5N1	1	1	avi	8 527	1 254	813	3 000	0	
	NINH BINH	H5N1	1	1	avi	892	143	97	749	0	
	QUANG BINH	H5N1	1	1	avi	3 100	20	18	3 000		
Aug	DONG THAP	H5N1	1	1	avi	510	250	135	314	0	
	THAI NGUYEN	H5N1	1	1	avi	510	251	185	315	0	
	TRA VINH	H5N1	1	1	avi	1 200	620	421	519	0	
Oct	CAO BANG	H5N1	2	2	avi	3 300	1 460	1 329	1 800	0	
	NAM DINH	H5N1	1	1	avi	400	300	210	190	0	
	QUANG TRI	H5N1	1	1	avi	600	310	290	310	0	
	TRA VINH	H5N1	2	2	avi	1 400	520	410	690	0	
Nov	BEN TRE	H5N1	1	1	avi	60	40	36	24	0	
	CAO BANG	H5N1	3	3	avi	429	260	205	224	0	
	HA NAM	H5N1	1	1	avi	700	620	590	110	0	
	QUANG TRI	H5N1	3	3	avi	3 233	1 518	1 128	2 105	0	
Dec	TRA VINH	H5N1	5	5	avi	9 800	880	880	8 920	0	

Porcine reproductive/respiratory syndr.

Month	Administration	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Mar	HA NOI CITY		1	1	sui	132	31	27	105	0	
	HAI DUONG		4	4	sui	220	87	48	0	0	
	HAI PHONG CITY		1	1	sui	520	270	59	12	0	
	HUNG YEN		3	3	sui	880	378	170	100	0	
	SON LA		1	1	sui	250	129	83	0	0	
	THAI BINH		1	1	sui	363	320	198	0	0	
	THANH HOA		1	1	sui	20	15	12	0	0	
Apr	BAC GIANG		1	1	sui	610	218	98	32	0	
	BAC NINH		1	1	sui	347	95	31	52	0	
	QUANG NINH		1	1	sui	4 000	2 903	700	401	0	
	VINH PHUC		1	1	sui	125	68	22	5	0	
May	BAC GIANG		0	1	sui	0					

	BAC NINH		0	1	sui	0					
	HUNG YEN		0	1	sui	0					
	THAI BINH		0	1	sui	0					
	VINH PHUC		0	1	sui	0					
Jun	QUANG NAM		21	21	sui	33 376	19 023	2 227	499	640	
Jul	DA NANG CITY		1	1	sui	731	425	81	28	27	
	LONG AN		1	1	sui	178	91	42	31	0	
	QUANG NAM		2	21	sui	302	130	11	49	9	
	QUANG NGAI		1	1	sui	290	122	12	21	78	
	THUA THIEN - HUE		2	2	sui	2 006	1 253	201	110	36	
Aug	BA RIA - VUNG TAU		1	1	sui	92	40	12	28	0	
	BINH DINH		2	2	sui	43	26	3	23	0	
	CA MAU		2	2	sui	606	261	59	532	0	
	KHANH HOA		2	2	sui	206	105	29	67	0	
	QUANG NAM		2	6	sui	65	25	10	26	0	
Sep	BA RIA - VUNG TAU		1	1	sui	21	7	5	5	0	0
	LANG SON		1	1	sui	26	5	0	5	0	0
	LONG AN		1	1	sui	25	12	5	7	0	0
Oct	HAI DUONG		2	2	sui	210	91	25	66	0	0
Dec	KHANH HOA		21	21	sui	5 341	3 590	2 159	1 431	0	0

Disease information for Report Year 2007

Foot and mouth disease

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan	A O Asia 1	48	109	bov	541	311	0	0	0	3 000
				buf	3 780	1 568	0	299	12	12 000
				sui	5 134	1 960	0	1 871	45	0
Feb	A O Asia 1	68	133	bov	984	223	0	0	0	2 000
				buf	1 500	793	1	9	8	3 000
				sui	1 200	566	0	226	120	4 000
Mar	A O Asia 1	24	45	bov	1 200	752	0	0	0	3 000
				buf	600	204	0	0	0	1 000
				sui	2 000	926	24	742	18	5 000
Apr	A O Asia 1	18	29	bov	413	155	0	0	0	1 000
				buf	120	50	0	0	0	980
				sui	310	140	0	0	0	1 100
May	A O Asia 1	10	31	bov	56	13	0	0	0	500
				buf	43	18	0	0	0	780
				sui	210	54	0	54	0	0
Jun	A O Asia 1	23	49	bov	1 000	767	0	769	0	103 100
				buf	5	3	0	3	0	550
				sui	23	15	0	15	0	0

Lumpy skin disease

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		3	4	buf	1 000	169	16	8	0	0
Feb		35	35	buf	412	121	45	76	0	1 200

Sheep pox and goat pox

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jul		0	0		0					
Aug		0	0		0					
Sep		0	0		0					
Nov		0	0		0					
Dec		0	0		0					

Classical swine fever

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		21	45	sui	8 653	720	312	219	0	15 000
Feb		29	55	sui	7 261	689	129	487	0	20 000
Mar		34	76	sui	6 124	559	213	258	0	25 000
Apr		35	78	sui	2 765	516	217	114	0	10 000
May		32	82	sui	3 415	445	383	98	0	21 000
Jun		26	43	sui	5 670	458	123	315	0	3 100
Jul		23	54	sui	2 500	1 231	231	324	0	15 000
Aug		21	54	sui	1 200	626	420	123	0	5 000

Sep		31	60	sui	1 500	496	339	98	0	5 000
Oct		32	80	sui	1 500	505	382	56	0	3 000
Nov		42	73	sui	1 455	477	363	78	0	20 000
Dec		11	29	sui	500	213	174	78	0	2 000

Highly path. avian influenza

Month	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Ring vaccinated**
Sep		0	0		0					

Newcastle disease

Month	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Ring vaccinated**
Jan		21	198	avi	31 000	33 131	9 125	0	0	50 000
Feb		48	269	avi	140 000	23 131	9 737	0	0	250 000
Mar		47	275	avi	57 000	18 085	9 893	0	0	120 000
Apr		62	216	avi	25 000	9 012	3 897	0	0	120 000
May		45	252	avi	35 000	15 373	9 832	0	0	0
Jun		30	216	avi	512 090	915 647	9 304	3 124	0	412 000
Jul		151	230	avi	100 000	10 090	8 901	2 100	0	200 000
Aug		209	312	avi	150 000	14 976	6 507	3 200	0	200 000
Sep		153	172	avi	12 000	6 730	3 292	1 269	0	50 000
Oct		242	278	avi	30 000	12 637	6 313	2 780	0	50 000
Nov		117	192	avi	10 000	6 440	3 286	1 209	0	30 000
Dec		49	121	avi	7 000	4 099	1 787	1 000	0	15 000

Anthrax

Month	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Ring vaccinated**
Jul		1	1	buf	56	6	6	2	0	1 200
Aug		2	2	buf	5	5	0	5	0	589
Sep		0	0		0					
Oct		0	0		0					
Nov		0	0		0					
Dec		0	0		0					

Leptospirosis

Month	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Ring vaccinated**
Jan		3	7	sui	525	120	23	12	0	0
Feb		7	8	sui	298	115	19	10	0	0
Mar		1	3	sui	21	9	9	0	0	0
Apr		8	17	sui	120	67	41	13	0	0
May		11	20	sui	1 102	72	11	21	0	0
Jun		7	18	sui	651	79	10	31	0	0
Jul		11	19	sui	198	72	56	6	0	0
Aug		21	27	sui	210	105	23	35	0	0
Sep		24	32	sui	623	177	49	12	0	0
Oct		48	52	sui	785	431	146	123	0	0
Nov		28	32	sui	312	139	48	76	0	0
Dec		15	24	sui	523	135	56	32	0	2 100

Rabies

Month	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Ring vaccinated**
Jan		1	1	can	2	2	2	0	0	100 000
Feb		2	2	can	106	16	16	0	0	200 000
May		1	1	can	1	1	1	0	1	100 000
Jun		1	1	can	1 200	4	4	0	0	250 000
Jul		0	0		0					
Aug		10	10	can	210	13	13	0	0	5 000
Sep		8	15	can	1 200	307	307	0	0	8 000
Oct		0	0		0					
Nov		0	0		0					
Dec		0	0		0					

Haemorrhagic septicaemia

Month	**Serotypes**	**New outbreaks**	**Total outbreaks**	**Species**	**Susceptible**	**Cases**	**Deaths**	**Destroyed**	**Slaughtered**	**Ring vaccinated**
Jan		45	126	bov	2 100	317	76	0	0	12 000
				buf	5 780	1 982	56	12	9	5 100
Feb		90	483	bov	5 283	575	83	0	0	12 000
				buf	9 810	1 203	120	0	0	25 000
Mar		105	407	bov	6 178	1 029	56	0	0	15 000
				buf	12 000	2 108	129	0	0	31 000

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Apr		98	268	bov	3 290	435	37	0	0	10 000
				buf	5 100	1 206	89	0	0	15 000
May		125	459	bov	16 010	1 527	65	0	0	25 000
				buf	20 000	2 100	121	0	0	30 000
Jun		105	459	bov	9 807	1 867	56	0	0	12 000
				buf	15 000	2 189	121	0	0	30 000
Jul		21	34	bov	3 120	214	54	0	0	4 510
				buf	4 130	213	42	0	0	3 100
				sui	5 000	1 239	432	213	0	12 000
Aug		247	382	bov	12 000	7 536	689	0	0	20 000
				buf	1 343	523	139	0	0	5 000
				sui	4 589	2 678	644	0	0	23 000
Sep		312	538	bov	20 000	12 156	1 100	0	0	50 000
				buf	2 138	568	121	0	0	5 000
				sui	5 124	2 973	785	0	0	12 090
Oct		323	456	bov	5 670	2 251	227	0	0	12 000
				sui	15 000	10 841	917	0	0	25 000
Nov		79	276	bov	5 672	1 311	167	0	0	15 000
				sui	1 290	7 750	439	0	0	20 000
Dec		123	294	bov	35 000	2 746	165	0	0	7 000
				sui	15 000	6 535	326	0	0	35 000

Surra (Trypanosoma evansi)

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		1	2	buf	10	7	0	0	0	500
Feb		1	2	buf	12	5	0	0	0	0
May		2	2	buf	12	5	0	0	0	0
Jun		1	2	buf	21	6	0	0	0	0
Jul		5	21	buf	129	49	12	10	0	450
Aug		7	19	buf	124	37	12	0	0	500
Sep		7	18	buf	320	73	2	0	0	500
Oct		4	12	buf	120	8	5	0	0	520
Nov		9	19	buf	600	20	0	0	0	530
Dec		8	15	buf	128	23	1	0	0	700

Porcine reproductive/respiratory syndr.

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		0	0		0					
Feb		0	0		0					
Nov		0	0		0					

Duck virus hepatitis

Month	Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
Jan		5	31	avi	3 145	1 200	543	0	0	12 000
Feb		8	21	avi	1 123	890	143	0	0	0
Mar		0	0		0					
Apr		0	0		0					
May		0	0		0					
Jun		0	0		0					
Jul		0	0		0					
Aug		0	0		0					
Sep		0	0		0					
Oct		0	0		0					
Nov		3	3	avi	12 000	3 689	1 348	1 000	0	2 000
Dec		0	0		0					

Disease information for Report Year 2007

Blackleg

Serotypes	New outbreaks	Total outbreaks	Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Ring vaccinated
	35	42	buf	1 060	128	78	50	0	1 200

4. Unreported Diseases

Multiple species

Echinococcosis/hydatidosis	Q fever	Japanese encephalitis
Tularemia	Other clostridial infections	Other pasteurelloses
Actinomycosis	Intestinal Salmonella infections	Brucellosis
Salmonellosis	Crimean Congo haemorrhagic fever	West Nile Fever

Brucellosis (Brucella melitensis)	Brucellosis (Brucella suis)	
Cattle		
Bovine brucellosis	Bovine cysticercosis	Dermatophilosis
Mucosal disease/DVB	Warble infestation	Bovine viral diarrhoea
Sheep/Goats		
Ovine pulmonary adenomatosis	Contagious pustular dermatitis	Foot-rot
Contagious ophthalmia	Caseous lymphadenitis	Sheep mange
Swine		
Atrophic rhinitis of swine	Enterovirus encephalomyelitis	Melioidosis
Vibrionic dysentery	Swine erysipelas	Nipah virus encephalitis
Equidae		
Epizootic lymphangitis	Horse pox	Horse mange
Equine coital exanthema	Ulcerative lymphangitis	Strangles
Encephalomyelitis (East.)	Encephalomyelitis (West.)	
Lagomorphs		
Myxomatosis		
Birds		
Avian infect. laryngotracheitis	Avian tuberculosis	Duck virus enteritis
Fowl pox	Marek's disease	Mycoplasmosis (M. gallisepticum)
Avian chlamydiosis	Infectious coryza	Avian encephalomyelitis
Avian spirochaetosis	Other avian salmonellosis	Avian leukosis
Turkey rhinotracheitis	Avian mycoplasmosis (M.synoviae)	Low pathogenic avian influenza (poultry)
Bees		
Acarapisosis of honey bees	American foulbrood of honey bees	European foulbrood of honey bees
Varroosis of honey bees	Tropilaelaps infestation of honey bees	Small hive beetle infestation
Other		
Leishmaniosis	Camelpox	

5. Zoonoses in Humans

Disease Name	Present diseases	Cases	Deaths
Anthrax	...	...	
Avian chlamydiosis	...	...	
Botulism	...	...	
Bovine cysticercosis	...	...	
Bovine tuberculosis	...	...	
Brucellosis	...	...	
Campylobacteriosis	...	...	
Crimean Congo haemorrhagic fever	...	...	
Ebola haemorrhagic fever	...	...	
Echinococcosis/hydatidosis	...	...	
Escherichia coli O157	...	...	
Glanders	...	...	
Hantavirus pulmonary syndrome	...	...	
Highly pathogenic avian influenza	+	8	5
Japanese encephalitis	...	...	
Leishmaniosis	...	...	
Leptospirosis	+	23	0
Listeriosis	...	...	
Marburg haemorrhagic fever	...	...	
Monkey pox	...	...	
New variant Creutzfeldt-Jakob disease	...	...	
New world screwworm (Cochliomyia hominivorax)	...	...	
Nipah virus encephalitis	...	...	
Old world screwworm (Chrysomya bezziana)	...	...	
Porcine cysticercosis	...	...	
Q fever	...	...	
Rabies	+	525	128
Rift Valley fever	...	...	
Salmonellosis	...	...	
Swine erysipelas	...	...	
Toxoplasmosis	...	...	
Trichinellosis	...	...	
Tularemia	...	...	

Venezuelan equine encephalomyelitis	...	...	
West Nile Fever	...	...	

6. Animal population

Species	Administrative region	Totals	Units	Number	Units
Birds	Whole country	226 027 100	Establishments	...	Animals
Buffaloes	Whole country	2 996 415	Establishments	...	Animals
Cattle	Whole country	6 884 791	Establishments	...	Animals
Equidae	Whole country	20 239	Establishments	...	Animals
Sheep / goats	Whole country	1 314 189	Establishments	...	Animals
Swine	Whole country	26 560 651	Establishments	...	Animals

7. Personnel

Veterinarians:

	Public administration	Both	Private accredited practitioners
Animal health activities	3231		986
Public Health activities (abattoirs, food hygiene, etc,)	897		67
Laboratories	245		69
Academics or Training Institutions		130	
Private practitioners in the pharmaceutical industry		210	
Independent Private Veterinarians		513	
Others (Vets working for other Ministries like Defence, Security, etc)		28	

Veterinary Paraprofessionals

	Public administration	Both	Private accredited practitioners
Animal health activities		23227	
'Community Animal Health workers'		25653	
Involved in food hygiene, including the abattoirs		2623	
Others		...	

8. National reference laboratories

Name of Laboratory	Contacts	Latitude	Longitude
National Centre for Veterinary Diagnosis	. undetermined	21.03	105.85
National Reference Laboratory for Avian Influenza	Dr Dung Truong Van	20.9965	105.8421

9. Diagnostic Tests

Name of Laboratory	Disease:	Test Type
National Centre for Veterinary Diagnosis	Classical swine fever	Enzyme-linked Immunosorbent Assay (ELISA)
		Reverse Transcription – Polymerase Chain Reaction (RT-PCR)
		Virus Isolation
		NPLA (Neutralising Peroxidase-linked Assay)
		Real-time Reverse Transcriptase/polymerase Chain Reaction (RRT-PCR)
	Foot and mouth disease	Antigen (Ag) Detection ELISA
		Real-time Reverse Transcriptase/polymerase Chain Reaction (RRT-PCR)
		Reverse Transcription – Polymerase Chain Reaction (RT-PCR)
		Virus Isolation
		ELISA 3ABC
		Liquid-phase (LP) Blocking ELISA
	Highly pathogenic avian influenza	Reverse Transcription – Polymerase Chain Reaction (RT-PCR)
		Intravenous Pathogenicity Index (IVPI) Test
		Haemagglutination Inhibition Test (HIT)
		Virus Neutralisation Test (VNT)
		Virus Isolation
		Real-time Reverse Transcriptase/polymerase Chain Reaction (RRT-PCR)
	Newcastle disease	Real-time Reverse Transcriptase/polymerase Chain Reaction (RRT-PCR)
		Virus Isolation
		Haemagglutination Inhibition Test (HIT)
	Porcine reproductive and respiratory syndrome	Immunoperoxidase Monolayer Assay (IPMA)
		Enzyme-linked Immunosorbent Assay (ELISA)
		Reverse Transcription – Polymerase Chain Reaction (RT-PCR)
		Virus Isolation
		Real-time Reverse Transcriptase/polymerase Chain Reaction (RRT-PCR)

10. Vaccine Manufacturers			
Manufacturer	**Contacts**	**Year of start of activity**	**Year of cessation of activity**
National Veterinary Drugs and Vaccines Ltd. Co	undetermined	...	...
National Veterinary Drugs Enterprise	undetermined .	...	...

11. Vaccines

Disease:	Vaccine type	Vaccine	Manufacturer	Year of start of production	Year of end of production (if production ended)
Anthrax	Live Attenuated Vaccine	Anthrax _NVD Enterprise	National Veterinary Drugs Enterprise	...	...
		Anthrax_NVDV Co	National Veterinary Drugs And Vaccines Ltd. Co	...	...
Classical swine fever	Live Attenuated Vaccine	CSF_NVD Enterprise	National Veterinary Drugs Enterprise	...	...
		CSF_NVDV Co	National Veterinary Drugs And Vaccines Ltd. Co	...	...
Duck virus enteritis	Live Attenuated Vaccine	Duck Plague_NVD Enterprise	National Veterinary Drugs Enterprise	...	...
		Duck Plague_NVDV Co	National Veterinary Drugs And Vaccines Ltd. Co	...	...
Fowl cholera	Inactivated Vaccine	Fowl Cholera_NVD Enterprise	National Veterinary Drugs Enterprise	...	...
Marek's disease	Live Attenuated Vaccine	Newcastle Thermorésistant_NVDV Co	National Veterinary Drugs And Vaccines Ltd. Co	...	...
Newcastle disease	Live Attenuated Vaccine	La Sota_NVD Enterprise	National Veterinary Drugs Enterprise	...	...
		Newcastle LA Sota_NVDV Co	National Veterinary Drugs And Vaccines Ltd. Co	...	...

12. Vaccine production

No information available

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Annex 6: Assessing the costs of NPS – Methodological approach for data collection in case study countries

A list of main functional units was first identified for each case study country (see section 2.3.4):

- At central level:
  - Central public veterinary authority (including central veterinary inspections in slaughterhouses, excluding veterinary diagnostic laboratories)
  - Border inspections
  - National veterinary diagnostic laboratory/ies
  - Veterinary Statutory Body[1]
- At sub-national level:
  - Sub-national units of public veterinary authority (including sub-national veterinary inspections of live animal markets and slaughterhouses, excluding veterinary laboratories)
  - Municipal veterinary departments
  - Sub-national veterinary diagnostic laboratories

According to the definition of the boundary of the NPS (see section 2.3.3), functions of each main functional unit were discussed in-depth during the interviews conducted in case study countries. Functions falling within and without the boundary of the NPS were therefore clearly identified and the final list of main functional units refined.

In other words:

- Functional units that were not relevant were those performing exclusively functions that were out of the boundary of the NPS.
- Costs of main functional units, that performed functions which completely fell within the boundary of the NPS, were fully taken into consideration.
- When main functional units performed both functions that were in and out of the scope of the NPS, only costs related to functions relevant for the NPS were taken into consideration. Such costs were derived on the basis of the proportion of professional staff (excluding support personnel) assigned to functions within the boundary of the NPS.

Similarly, in case that no separate budget data were available for functional units that performed functions within the boundary of the NPS, because these were integrated in larger divisions/departments and the accounting system did not allow to provide such data for smaller units, estimates were developed on basis of the proportion of professional staff assigned to the relevant functions (excluding support personnel).

In case that no consolidated budget figures for sub-national main functional units were available at central level, data were collected for a sample of units. For instance, in case of a country with 50 municipalities having a VS unit, for which no consolidated budget figures at central level

[1] Where existing. The expenditures of the Veterinary Statutory Body are considered here, because these bodies are generally financed by compulsory membership fees, which have the character of a quasi-tax.

were available, data were collected from a sample of two to five units and extrapolated to obtain the total figure, on basis of the number of professional staff employed in the 50 municipalities.

For this extrapolation, professional staff working in the area of livestock production and other areas excluded from the NPS (and related costs) were not considered. In case that staff members worked on both included and excluded areas, e.g. on animal health (included) and livestock production issues (excluded), professional staff numbers (and related costs) were adjusted according to the time spent for the different functions. If the sample of sub-national units concluded, that on average e.g. 40% of the professional staff working time of a sub-national unit was spent on NPS related activities, this factor was taken into account for the extrapolation of staff and budget data.

Annex 7: Correlations between relevant variables

Table 7.1: Pair-wise correlations: variables possibly linked with total NPS expenditure

	Inc. donor	Land area	Population	VLUs	GDP/PPP	Ag.Val.Ad.	Ntl. Budget	IIT meat	IIT dairy	IIT all LPs	Vets.	Outbreaks	Av. PVS
NPS cost	**1.00**	0.22	0.76	**0.80**	**0.99**	**0.97**	**1.00**	-0.09	0.53	0.18	0.64	0.64	0.30
Inc. donor		0.20	0.77	**0.81**	**0.99**	**1.00**	0.55	-0.07	0.52	0.18	0.64	0.67	0.29
Land area			-0.07	0.20	0.16	0.09	0.16	-0.24	-0.24	0.41	0.03	-0.08	-0.21
Population				**0.95**	0.70	**0.88**	0.75	0.07	0.52	-0.35	**0.88**	**0.94**	0.23
VLUs					0.74	**0.88**	0.78	0.48	-0.02	-0.22	**0.85**	**0.84**	0.10
GDP/PPP						**0.96**	**1.00**	-0.16	0.60	0.22	0.58	0.59	0.30
Ag.Val.Ad.							**0.97**	0.09	0.41	0.00	0.77	0.79	0.28
Ntl. Budget								-0.11	0.56	0.18	0.63	0.66	0.31
IIT meat									-0.63	-0.67	0.42	0.06	0.58
IIT dairy										0.38	-0.14	0.42	-0.19
IIT all LPs											-0.32	-0.46	-0.38
Vets.												**0.88**	0.00
Outbreaks													0.40

Details of variables:
NPS cost: Total domestic expenditure on National Prevention System
Inc. donor: Total expenditure on National Prevention System, including donor contribution
Land area: Total land area
Population: Total human population
VLUs: Total livestock population measured in Veterinary Livestock Units
GDP/PPP: Gross Domestic Product measured in Purchasing Power Parity International Dollars
Ag.Val.Ad: Agricultural Value Added measured in Purchasing Power Parity International Dollars
Ntl. Budget: National Government Budget measured in Purchasing Power Parity International Dollars
IIT meat: Intra-Industry Trade index for meat
IIT dairy: Intra-Industry Trade index for dairy produce
IIT all LPs: Intra-Industry Trade index for all livestock products
Vets: Number of public sector veterinarians employed in the NPS
Outbreaks: Number of disease outbreaks reported to the OIE
Av. PVS: Average score for all competencies in PVS

Table 7.2: Pair-wise correlations: variables possibly linked with NPS cost per VLU

	GNI/caput	Lstk dnsty	% rumnt.	VLU/vet.	Outbreaks	Net Xports	IIT meat	IIT dairy	IIT all LPs	Av. PVS	Av. PVS2
NPS/VLU	**0.87**	-0.23	-0.11	-0.18	0.23	0.49	-0.76	**0.95**	0.36	0.67	0.72
GNI/caput		-0.05	-0.21	-0.22	0.21	0.47	-0.53	**0.81**	0.14	0.66	0.70
Lstk dnsty			-0.76	-0.01	0.64	-0.62	**0.83**	-0.26	**-0.83**	0.18	0.04
% rumnt.				0.10	**-0.88**	-0.11	-0.44	-0.08	0.75	-0.63	0.24
VLU/vet.					-0.25	0.08	0.20	0.11	-0.04	0.27	0.38
Outbreaks						-0.73	0.42	0.06	-0.46	0.40	0.35
Net Xports							-0.71	0.50	0.58	-0.04	0.09
IIT meat								-0.63	-0.67	-0.19	-0.30
IIT dairy									0.38	0.58	0.73
IIT all LPs										-0.38	-0.13
Av. PVS											**0.95**

Details of variables:
NPS/VLU: Domestic expenditure on National Prevention System per Veterinary Livestock Unit
GNI/caput: Gross National Income per head of population in Purchasing Power Parity International Dollars
Lstk dnsty: Livestock density in Veterinary Livestock Units per square kilometre of land
% rumnt: Ruminant VLUs as a percentage of all VLUs
VLU/vet.: Veterinary Livestock Units per NPS veterinarian
Outbreaks: Number of disease outbreaks reported to the OIE
Net Xports: Value of exports of livestock products minus imports of livestock products
IIT meat: Intra-Industry Trade index for meat
IIT dairy: Intra-Industry Trade index for dairy produce
IIT all LPs: Intra-Industry Trade index for all livestock products
Av. PVS: Average score for all competencies in PVS
Av. PVS2: Average score for Component II of PVS

Annex 8: Calculating livestock units

Table 8.1: Examples of conversion coefficients for calculating livestock units

Source	Cattle	Sheep	Goat	Swine	Poultry	Horses	Camels	Rabbits	Buffalos	Dogs and cats
OIE - VLU[(a)]	**1**	**0.1**	**0.1**	**0.2**	**0.01**	**0.5**	**0.5**	n.a.	n.a.	n.a.
Other coefficients for livestock units										
Tropical Livestock Unit (TLU) [(b)]	1.0	0.1 (small ruminant)	0.1 (small ruminant)	0.2	n.a.	1.1	1.2	n.a.	n.a.	n.a.
FAO - Livestock Unit[(c)]	Ranging from 0.5 (Sub-Saharan Africa) to 1 (North America)	Ranging from 0.1 (North America) 0.15 (Sub-Saharan Africa)	0.1	Ranging from 0.2 (Sub-Saharan Africa) to 0.25 (North America)	Ranging from 0.01 (chickens) to 0.03 (ducks, turkeys, gees)	0.8	1.1	0.2	Ranging from 0.5 (Sub-Saharan Africa) to 1 (North America)	n.a.
Veterinary Livestock Unit Requiring Care (US e-CFR) [(d)]	2	0.5	n.a.	0.5	0.002	n.a.	n.a.	n.a.	n.a.	n.a.
***Unité Gros Bétail* (UGB) [(e)]**	Ranging from 0.1 (bovine up to 120 days) to 1 (milk cows)	Ranging from 0.03 (pasturage lamb less than six months) to 0.25 (milk sheep)	Ranging from 0.085 (dwarf goats) to 0.2 (milk goats)	Ranging from 0.06 (piglets) to 0.55 (suckler sow)	Ranging from 0.004 (pullets and young broilers) to 0.26 (ostrich more than 3 months)	Ranging from 0.25 (ponies) to 1 (horses more than 30 months)	n.a.	0.009	n.a.	n.a.

Note: This coefficients have different purposes and are not directly comparable.

(a) OIE Guidelines for writing of the OIE-PVS Evaluation report 2008.
(b) PACE 2005.
(c) FAO. Retrieved from: http://www.fao.org/es/ess/os/envi_indi/annex2.asp
(d) US Electronic Code of Federal Regulations (e-CFR). Retrieved from: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=6d2f53f4f8c510673ac65eec8be5867a&rgn=div9&view=text&node=42:1.0.1.1.6.0.1.5.7&idno=42.
(e) Federal Authorities of the Swiss Confederation. Retrieved on 24 June 2009 from: http://www.admin.ch/ch/f/rs/910_91/app1.html

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