

## PARTICIPATION OF SMALL FARMERS IN ANIMAL HEALTH PROGRAMMES

**Delia Grace<sup>(a)</sup>, Christine Jost<sup>(a)</sup>, Gavin Macgregor-Skinner<sup>(b)</sup>, Jeffrey C. Mariner<sup>(a)</sup>**

<sup>(a)</sup> International Livestock Research Institute<sup>1</sup>

<sup>(b)</sup> MACRO International Inc.<sup>2</sup>

Original: English

**Summary:** Small farmers own 85% of the world's farms and their participation in animal health programmes is crucial if programmes are to achieve their goals.

A questionnaire was sent to the Veterinary Authorities of OIE<sup>3</sup> Members. The results showed that the majority (median 90%) of livestock farms are considered small. Veterinary Authorities believed that small farmers contribute to the livestock economy, but are a major weak point to national biosecurity. Small farmers' animal health needs were seen as higher, but their available capacity to address these needs was lower than larger farmers. Although the majority of countries did not disaggregate data by farm size, most respondents believed that publicly funded projects should be reviewed for size bias, and that small farmers' associations should have a role in guiding animal health policies. In the majority of countries, small farmers have a role in all aspects of control of priority and non-priority diseases. In one third of countries that responded, they have a role in extension, and in a few countries are even involved in veterinary drug importation and sale. Community animal health workers (CAHWS), who are usually small farmers selected by their community and trained as service providers on selected animal health activities, are emerging as important providers of services in Africa, the Americas and Asia. Officially mandated disease prevention and control programmes focus mainly on the diseases of cattle, and are hence less relevant to small farmers. Small farmers directly provide information used for surveillance in most countries, and provide more than 80% of such information in some countries.

Veterinary Authorities had a positive attitude towards the role of small farmers in surveillance, with most agreeing that small farmers had useful knowledge, could identify common diseases and had a lot of trust in their national veterinary services. Respondents considered extension by veterinarians, radio and community meetings to be the most highly effective way of reaching small farmers. The majority of Veterinary Authorities (79%) felt that the role of small farmers in animal health should increase, and suggested that this could be done through capacity building, programmatic change and organisation of farmers.

Ninety per cent of respondents believed that the OIE should do more to involve small farmers in animal health. Respondents felt that the highest priority action to increase the role of small farmers in animal health is additional funding, followed by improved communication, and thirdly by new standards. The results suggest that a review of international standards, definitions and guidelines with the aim of encouraging small farmer participation is appropriate. The diversity of views, often statistically significant between regions, suggests that the principle of equivalence should be applied in developing methods tailored to the local context to enhance the involvement and level of service provided to small farmers.

**Key words:** animal production – small farm – animal health service – disease surveillance – community animal health worker – CAHW

---

1 International Livestock Research Institute, P.O. Box 30709, Nairobi 00100, Kenya

2 MACRO International Inc., 11785 Beltsville Drive, Calverton, MD 20705, United States of America

3 OIE: World Organisation for Animal Health

## 1. Introduction

Livestock production has been called the next food revolution. Massive increases in consumption are being driven by rising incomes and globalisation of consumer habits, while technological changes are giving rise to mechanised, high-density, high-input, and low-labour production systems. Faced with these changes mainstream economists have been confidently predicting the demise of the small family farm for decades, and many decision and policy makers regard small farmers as unproductive and inefficient—an obstacle to the efficient feeding of the world's growing population [1].

The last century showed a clear increase in average farm size and specialisation correlated to the level of national economic development. Despite this trend, important exceptions remain: small farms in north-west Europe and decreasing farm size in Asia despite economic growth. Small farmers<sup>1</sup> own 85% of the world's 525 million farms, making them numerically the most important category of farmer. In line with the world's population distribution, the overwhelming majority of small farms are located in Asia (87%), then Africa (8%) and Europe (4%) [2].

Small farmers are a widely diversified group, varying from middle-class family businesses well-integrated into the market economy, to subsistence farmers (constituting almost 75% of the world's poor), to hobby farmers keeping animals mainly for recreational purposes [3]. In the developing world, small farmers are among the most disadvantaged and vulnerable groups. Half of all undernourished people in the world, three quarters of Africa's malnourished children, and the majority of people living in absolute poverty can be found on small farms [4, 5].

As veterinary services become more service oriented, there has been an emphasis on consulting farmers and involving them in the planning and implementing animal health programmes [6]. Although small farmers constitute the majority of farmers, little is known about the characteristics of small livestock farmers, and how they can be best served and best motivated to participate in programmes for the private and public good.

This paper reports the results of an OIE questionnaire on the participation of small farmers who own livestock—including small-scale operations and households that keep livestock—in animal health services. One limitation of the study was that Member Countries do not share a standard definition of the term 'small farmers'; however, the study provides data to the OIE and the OIE Delegates on the participation of small farmers in animal health activities.

## 2. Survey methodology

Questionnaires were sent to the Veterinary Authorities of all 172 OIE Member Countries and Territories, of which 119 responded. Singapore did not complete the questionnaire as they reported having no small livestock farms. Countries categorised by the World Bank as 'high-income' or 'upper-middle-income' were considered 'high-income', and those categorised as 'lower-middle-income' or 'low-income' were considered 'low-income' [7].

The  $\chi^2$  test was used to compare categorical variables between two groups and the Student's  $t$  test to compare continuous variables. The Kruskal-Wallis test, a non-parametric analogue of the one-way ANOVA, was used to compare categorical variables in several groups and the  $\chi^2$  test to compare dichotomous values. In analysing Likert scales, ordinal data were converted into categorical data according to the most common response (so if the modal response was agreement then data were categorised as 'agree' or 'not agree' and if the modal response was disagreement, data were categorised as 'disagree' or 'not disagree'). Pearson correlations were used to explore relations between provision of services by small farmers and other actors. Factor analysis was used to identify some of the underlying drivers of differences in perceptions between respondent groups [8]. Ordinal data were first summed across several questions to produce an approximately normal score. Principal component analysis (PCA) was used with orthogonal varimax rotation. All statistical calculations were performed using the statistical package Stata version 8.0<sup>2</sup>.

---

1 Defined as a farm of less than 2 hectares

2 StataCorp. 2003. *Stata Statistical Software: Release 8*. College Station, TX: StataCorp LP

### 3. Results

#### 3.1. Importance and characteristics of small farmers

##### 3.1.1. Farm size

Half (51%) of the respondents (responding countries) categorised livestock farms according to size, countries in the Americas being the most likely to do so and countries in Africa the least likely ([Table 1](#)). There was no significant difference in response rate between high-income and low-income countries (54% vs 46%, p=0.572).

*Table 1.– Categorisation of livestock farms according to size*

Region	Number of responding countries	Percentage of respondents reporting an official definition for categorising livestock farms according to size
Africa	26	40%
Americas	20	78%
Asia	27	50%
Europe	42	44%
Oceania	4	75%
<i>World</i>	<i>119</i>	<i>51%</i>

Among countries that categorise, the definition of small livestock farms was not standardised; small livestock farms could be defined by area of farm, number of animals, farming system, farming purpose, farm income, farm capital and labour, or combinations of these criteria. Many countries provided supplemental information on how they defined small farms. The term ‘small’ is often, albeit not always correctly, used interchangeably with smallholder, family, subsistence, resource poor, low-income, low-input, or low-technology farming [9]. For example, Croatia defined a small farm as keeping fewer than 3 cattle while in Bulgaria it was fewer than 50 cattle; in Panama a small farm is less than 0.1 hectare and in Tunisia less than 10 hectares. Some countries’ definition differed by species for farms with cattle, sheep, goats, etc. One country (the Netherlands) defined small farmers as ‘hobby farmers’.

##### 3.1.2. Importance of small farmers

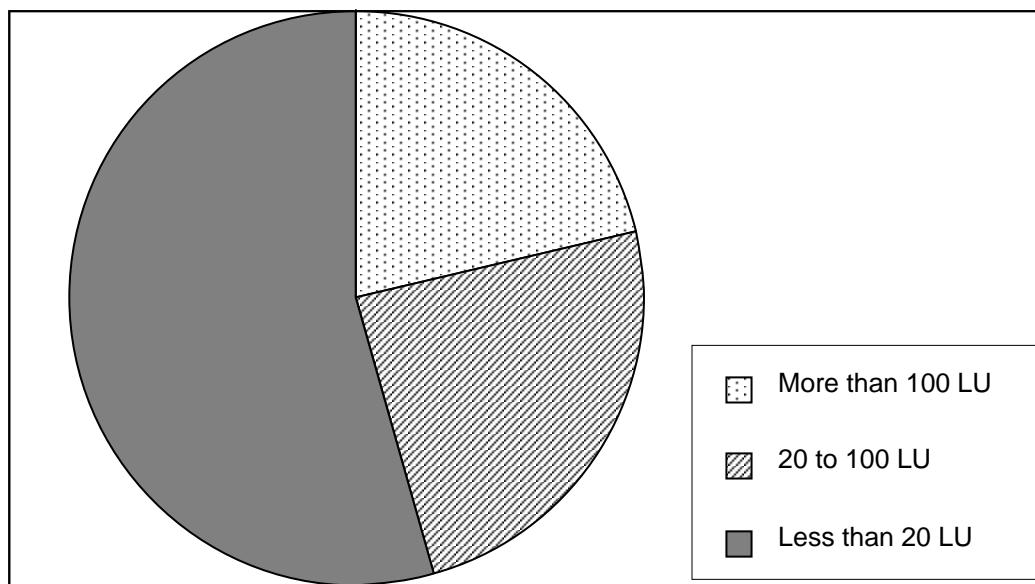
Small farms (as defined by each country) were reported to be the majority of all national farms, being 57% the average part of small farms in the responding countries. A larger part of small farms was reported in low-income countries than in high-income countries (61% vs 53%) and this was not significantly different (p=0.374).

Sixty per cent of respondents categorised farms by livestock unit (LU)<sup>1</sup>. Among these countries, 79% of farms had less than 100 LUs and 56% less than 20 LUs, and the median response was 90% of livestock farms were small ([Figure 1](#)).

---

<sup>1</sup> 1 LU was defined by the authors as 1 head of cattle, 4 sows, 10 fattening pigs, 6 sheep or 5 goats and small farms were defined as less than 100 LUs

*Figure 1.– Distribution of farms by livestock unit (LU)  
in countries categorising farms by LU*



### **3.1.3. Small farmer characteristics**

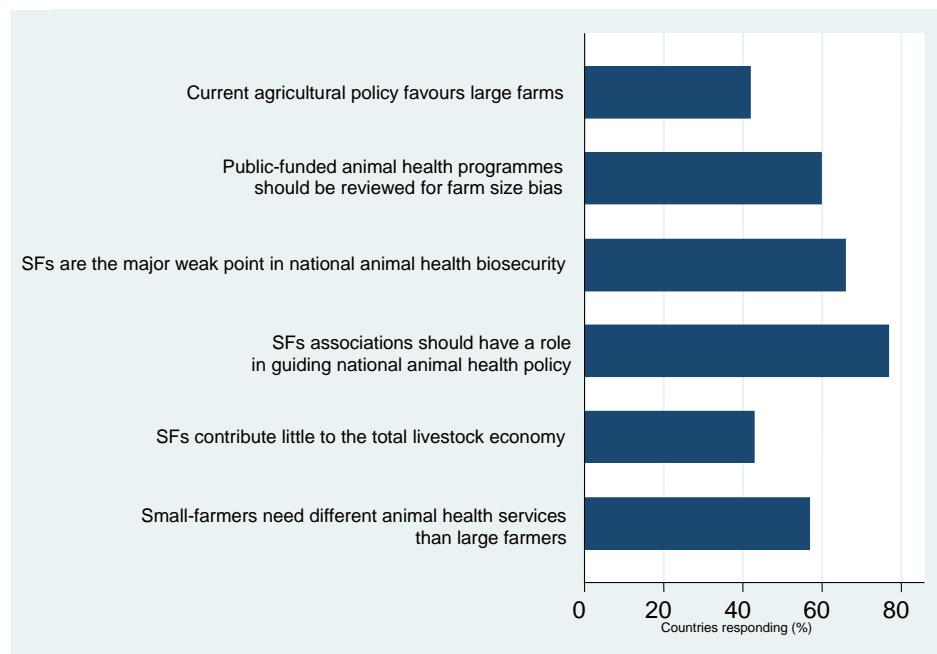
National Veterinary Authorities reported that farmers from small livestock holdings are more likely to be female in low-income countries (36% vs 27%, p=0.052) and in Africa and Europe; male in high-income countries (32% vs 25%, p=0.052) and in Asia and the Americas; have lower literacy in low-income countries (13% vs 5%, p=0.002) and in Africa, the Americas and Asia.

The small farmer was perceived to have less knowledge of, and participation in, disease control programmes, and much lower participation in farmers' associations. In Africa, the small farmer was reported to be further removed from service providers. The animal health needs of small farmers were perceived to be higher in all regions, they were seen to keep a wider range of species (especially in low-income countries), they experience more animal health problems and have much higher dependence on state veterinary services than larger farmers.

### **3.1.4. Attitude towards small farmers**

Less than half of the Veterinary Authorities who responded (43%) reported that "small farmers contribute little to the total national livestock production". Low-income countries were significantly more likely than high-income countries (33% vs 63%, p=0.001) to disagree with this statement given in the questionnaire. The majority of the respondents (57%) reported that "small farmers need different animal health services than large farmers". Sixty-six per cent of the respondents reported that "small farmers are the major weak point in national animal health biosecurity". Low-income countries were significantly more likely to agree with this statement than high-income countries (82% vs 52%, p=0.001). Less than half of the respondents (42%) reported that "current agricultural policy favours large farms". High-income countries were significantly more likely to agree with this statement than low-income countries (53% vs 27%, p=0.005). Overall, 77% reported that "small farmers' associations should have a role in guiding national animal health policy". (Figure 2).

*Figure 2.– Percentage of respondents agreeing with statements in the questionnaire on the small farmers' needs, contribution and role*



### 3.2. Involvement of small farmers in animal health service provision

#### 3.2.1. Structure of animal health services

Ninety five per cent of the respondents (i.e. 113 countries) reported the number of veterinarians providing animal health services to farmers in their countries; just over half (56%) of the respondents have para-professionals; while pharmacists and community animal health workers (CAHWs) operate in only one-third of the responding countries (36% and 31%, respectively) (Table 2). This indicates that many respondents do not have data on lower level providers, while most countries can report about veterinarians.

*Table 2.– Percentage of respondents reporting the presence of trained animal health service providers*

	Africa	Americas	Asia	Europe	Oceania	Total
Veterinarian	96	95	89	98	100	95
Paraprofessional	73	50	74	36	75	56
Pharmacist	31	35	30	45	25	36
CAHW	58	40	33	12	0	31

Considering trained service providers only, the public sector predominates in Africa, the Americas (except for, Canada, Costa Rica, Uruguay and USA where the private sector employs more veterinarians<sup>1</sup>) and Asia; the private sector predominates in Europe and Oceania. Although veterinary privatisation has been promoted for several decades, it is still under-developed in many countries [10, 11].

National Veterinary Authorities reported that there were more veterinarians than other categories of service providers, and more public sector veterinarians than private veterinarians. The People's Republic of China has the most with 326,214 or 52% of the world's accredited veterinarians, and Liechtenstein reported the least with two veterinarians. It was reported that non-accredited veterinarians were working in 19 countries: in 8 countries in the Americas, 8 countries in Europe, 2 countries in Asia, and 1 country in Africa. The greatest number of unlicensed veterinarians was in the Americas.

1 4.5 times, 1.2 times, 4.5 times and 24 times, respectively

### 3.2.2. Objectives of animal health services

Respondents identified a total of 33 highly important animal diseases targeted by officially mandated prevention and control programmes. Ten diseases accounted for 65% of all responses, and of these, four were zoonotic diseases. The disease prioritisation results are presented in Table 3 in rank order according to the number of times each disease was mentioned. Rinderpest was only mentioned once. The diseases were scored using a system based on assignment of a decreasing number of points for first, second and third priority, and important differences in rank order were observed. Based on the scoring, the order of priority for the top-10 diseases was foot and mouth disease (68), transmissible spongiform encephalopathy (29), avian influenza (22), Newcastle disease (20), tuberculosis (19), contagious bovine pleuropneumonia (19), brucellosis (17), classical swine fever (17), peste des petits ruminants (14), and bluetongue (13).

*Table 3.– Ranking for high-priority animal diseases targeted by official national mandated programmes*

Priority livestock disease	1st priority	2nd priority	3rd priority	Total	Score	Main species affected	Zoonosis*
Foot and mouth disease	18	6	2	26	68	Cattle	2
Newcastle disease	0	8	4	12	20	Poultry	2
Avian influenza	5	1	5	11	22	Poultry	1
Transmissible spongiform encephalopathy	8	2	1	11	29	Cattle	1
Brucellosis	2	4	3	9	17	Cattle	1
Classical swine fever	2	4	3	9	17	Pig	
Tuberculosis	4	2	3	9	19	Cattle	1
Peste des petits ruminants	0	6	2	8	14	Small ruminant	
Bluetongue	2	2	3	7	13	Cattle	
Sheep pox and goat pox	1	2	4	7	11	Small ruminant	
Contagious bov. pleuropneumonia	6	0	1	6	19	Cattle	
East Coast fever	1	1	3	5	8	Cattle	
Enzootic bovine leukosis	2	2	1	5	11	Cattle	
Rabies	0	3	1	4	7	All	1
Aujeszky's disease	0	3	0	3	6	Pig	
Vesicular stomatitis	3	0	0	3	9	Cattle	
Endoparasitism	0	0	3	3	3	All	2
Infectious bovine rhinotracheitis	0	1	2	3	4	Cattle	
Anthrax	0	0	2	2	2	Cattle	1
Bovine viral diarrhoea	1	0	1	2	4	Cattle	
Enterotoxaemia	0	2	0	2	4	Cattle	
Equine infectious anaemia	0	1	1	2	3	Horse	
Leptospirosis	1	0	1	2	4	All	1
Paratuberculosis	1	1	0	2	5	Cattle	2
Trypanosomosis	0	2	0	2	4	Cattle	1
Haemorrhagic septicaemia	1	0	1	2	4	Cattle	
Lumpy skin disease	0	1	1	2	3	Cattle	
Contagious agalactia	0	0	1	1	1	Small ruminant	
Black leg	0	1	1	1	3	Cattle	
Blue ear	0	0	1	1	1	Pig	
Enzootic abortion	0	1	0	1	2	Small ruminant	
Rift Valley fever	0	0	1	1	1	Small ruminant	1
Rinderpest	1	0	0	1	3	Cattle	
Total	59	56	52	167	341		8

\* 1 = important zoonosis, 2 = minor or suspect zoonosis

Overall, approximately one quarter (24%) of the diseases mentioned is important zoonoses. Cattle diseases accounted for 59% of the diseases targeted, while diseases of animals (sheep, goats, poultry and pigs) kept by small farmers and low-income earners accounted for 30% of diseases identified.

Respondents reported 19 zoonotic diseases that were targeted by officially mandated prevention and control programmes. Five diseases accounted for 78% of the responses and these were brucellosis, rabies, tuberculosis, salmonellosis and avian influenza (Table 4).

In the rest of the paper, these animal and zoonotic diseases are referred to as ‘priority diseases’ while other animal and zoonotic diseases are referred to as ‘non-priority diseases’.

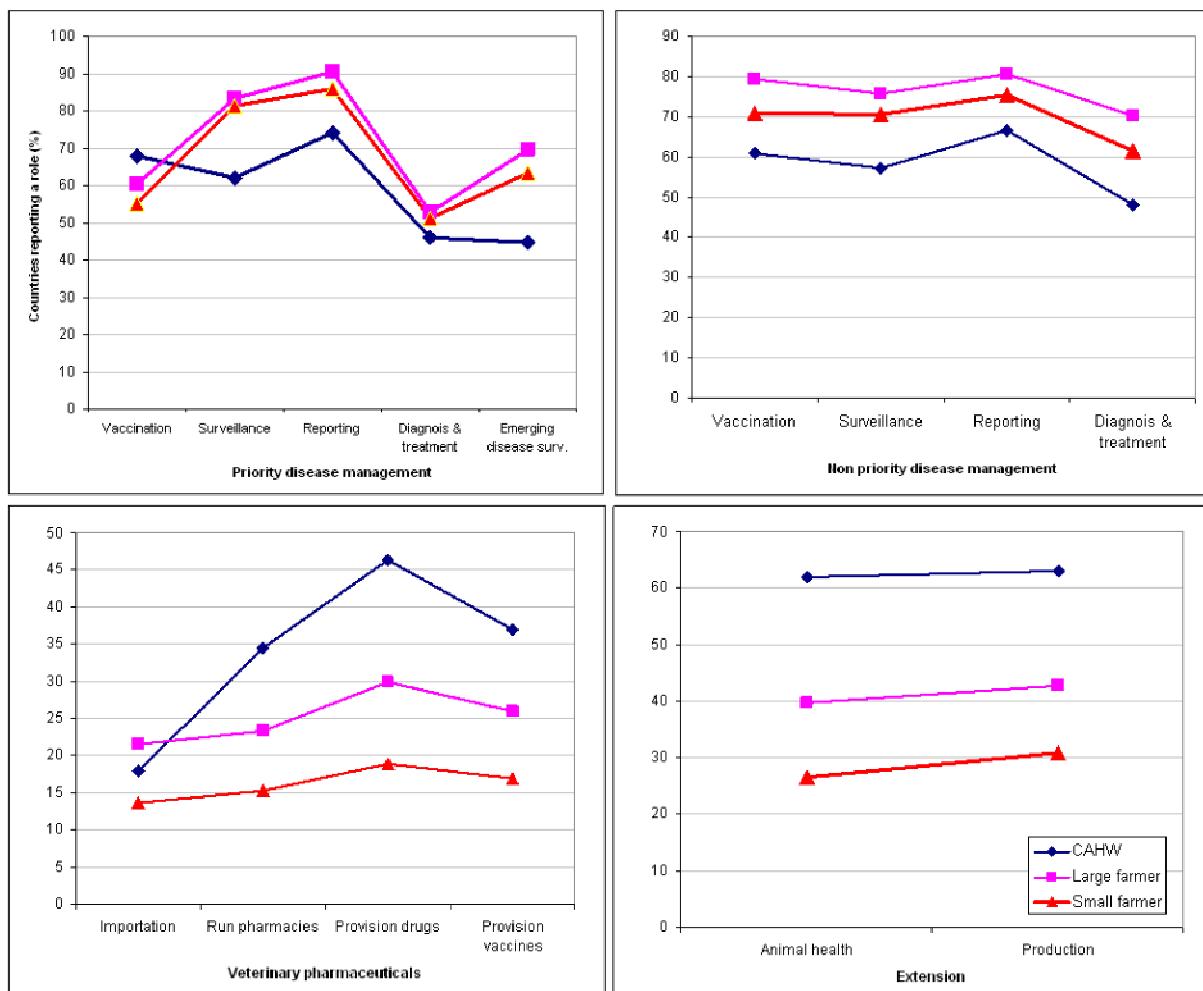
*Table 4.– High-priority zoonotic diseases targeted by official national mandated programmes*

Zoonosis	1st priority	2nd priority	3rd priority	Total
Brucellosis	11	10	15	36
Rabies	13	11	6	30
Tuberculosis	8	8	6	22
Salmonellosis	5	8	3	16
Avian influenza	11	2	1	14
Anthrax	3	3	3	9
Bovine spongiform encephalopathy	3	2	0	5
Campylobacteriosis	0	2	2	4
Echinococcosis	0	1	2	3
Leptospirosis	0	2	1	3
Cysticercosis	0	0	2	2
Bovine anaplasmosis	0	1	0	1
Equine encephalomyelitis	0	0	1	1
Rift Valley fever	0	1	0	1
Trichinellosis	0	1	0	1
Leishmaniosis	0	1	0	1
Norovirus	0	0	1	1
Tapeworm infestation	0	0	1	1
Total	54	53	44	151

### 3.2.3. Involvement of small farmers in veterinary service provision

Overall, respondents reported that small farmers had a role in the provision of all aspects of veterinary services for priority and non-priority diseases. About one-third reported a role in extension, and a 15% reported a role for small farmers in drug provision. Respondents reported that large farmers had a greater role in all aspects of veterinary service provision. Among those respondents reporting the presence of CAHVs, the majority reported that they were involved in all aspects of veterinary services except pharmacy operation, drug importation and vaccine provision (Figure 3). Relative to other service providers, small farmers are perceived to be less important than veterinarians and large farmers, but more important than para-professionals, lay people and veterinary pharmacists.

*Figure 3.– Percentage of respondents\* reporting a role for farmers and CAHVs in different aspects of service provision*

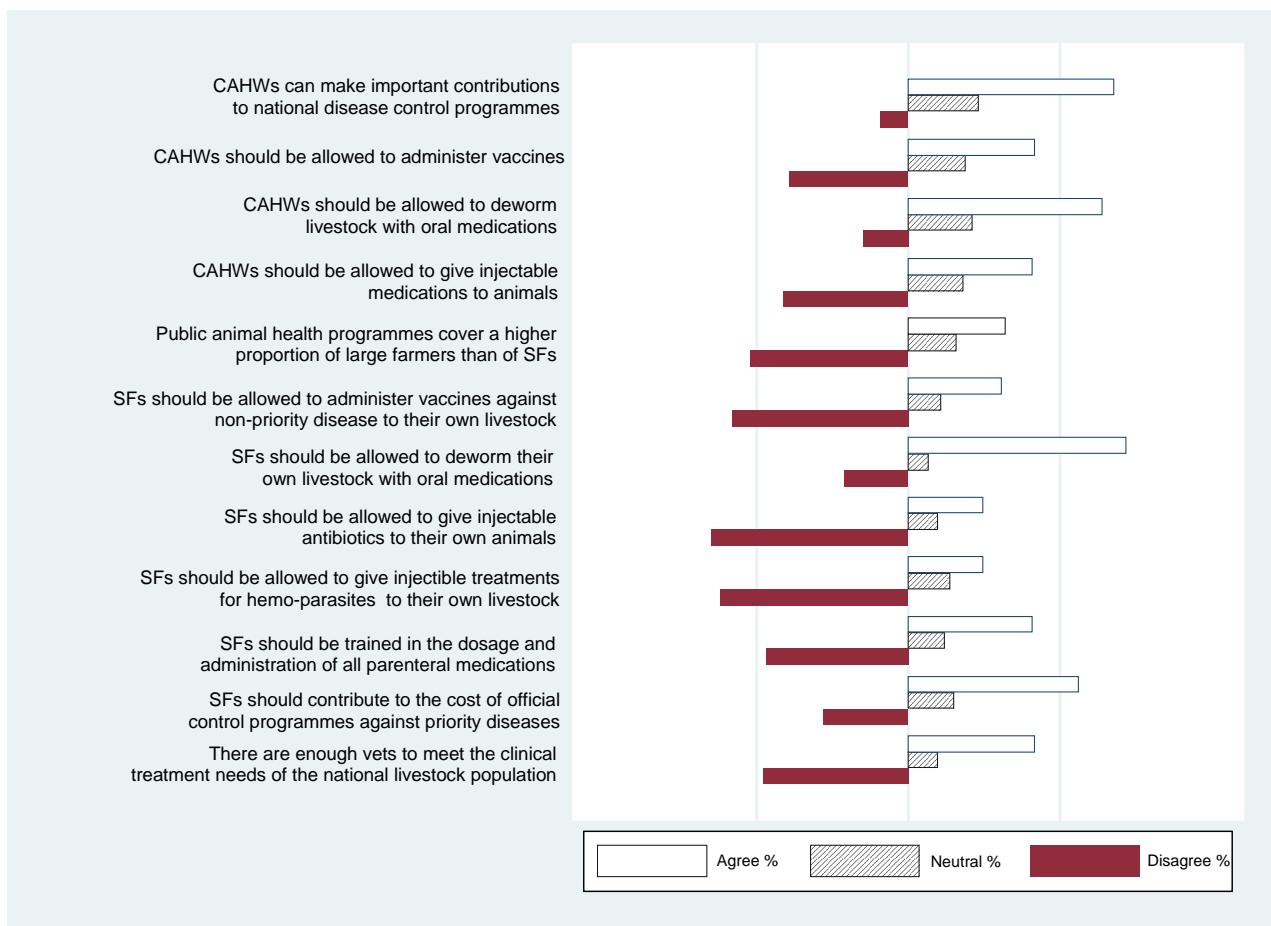


\* Only those countries reporting the presence of CAHVs are included.

A large minority of respondents indicated that public veterinary services had a role in non-priority disease interventions, for example, the central public veterinary services had a standardised importance score of 47 and 38 out of 100 for the provision of vaccination and drugs against non-priority diseases, respectively.

### 3.2.4. Attitude towards involvement of small farmers in veterinary service provision

Approximately half of the respondents (48%) considered that there were not enough veterinarians in their countries. While 72% agreed that small farmers should be allowed to deworm their animals, respondents generally did not agree that they should be allowed to administer injectable drugs (antibiotics and anti-hemoparasitics) or vaccines (65%, 62% and 58%, respectively). Globally, respondents were equally divided in their attitudes towards the giving of injections (41% vs 41%) and vaccines (42% vs 39%) by CAHVs but generally agreed (68%) that they can make important contributions to national animal health programmes (Figure 4).

*Figure 4.– Attitude to involvement of farmers and CAHVs in animal health service provision*

The significant differences between high-income and low-income countries were that low-income countries were less likely to agree that there were sufficient veterinarians (29% vs 53%,  $p=0.008$ ) and more likely to agree that CAHVs have an important role to play in animal health (79% vs 58%,  $p=0.018$ ). It can be argued that these beliefs are related (Table 5). In terms of regions, respondents from Europe tended to agree less with the involvement of CAHVs and small farmers in animal health services. Respondents from Africa tended to agree less with involvement of small farmers but more with involvement of CAHVs.

*Table 5.– Attitudes of respondents from low- and high-income countries to veterinarians and CAHVs in animal health service provision*

Statement	Low income	High income	$P(\chi^2)$
There are enough public and private vets to meet the clinical treatment needs of the national livestock	29	53	0.008
Community animal health workers should be allowed to deworm livestock with oral medications	77	51	0.004
Community animal health workers should be allowed to give injectable medications to animals	49	32	0.074
Community animal health workers can make important contributions to national disease control programmes	79	58	0.018

### 3.2.5. Involvement of small farmers in livestock disease surveillance

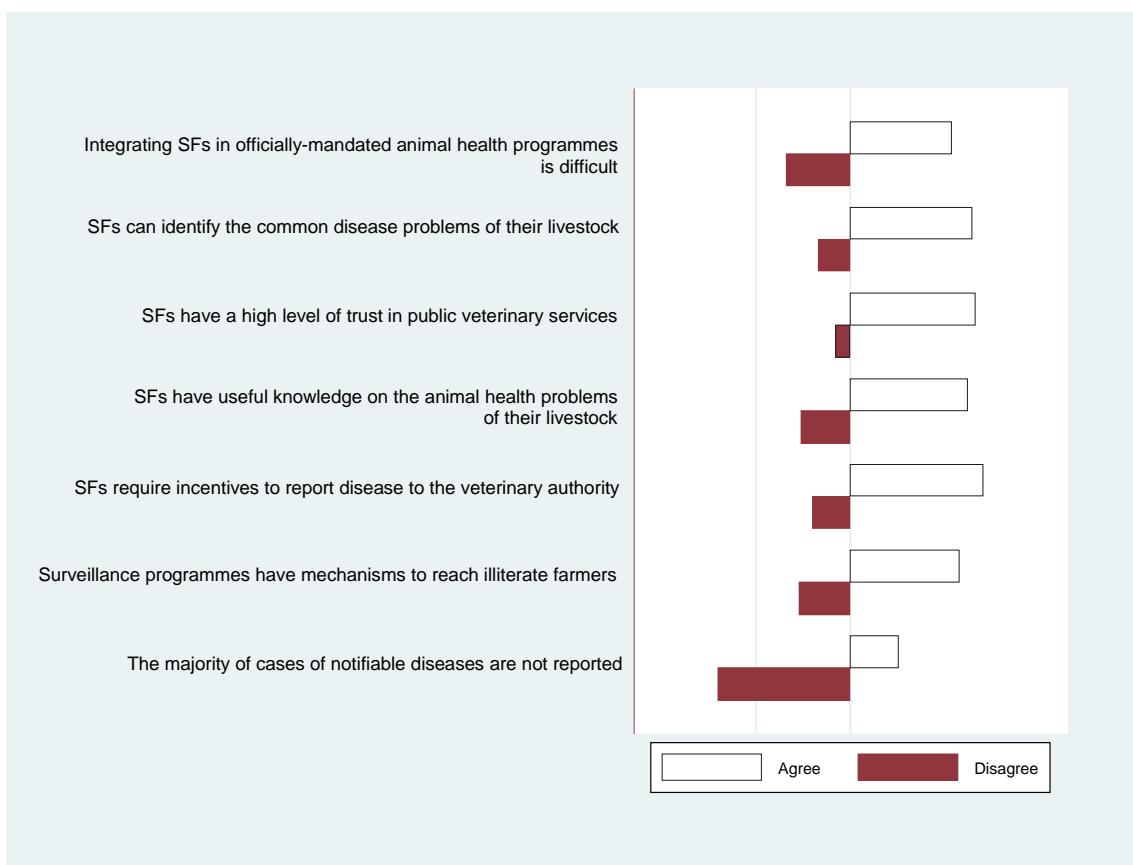
Approximately one-third of respondents (31%) reported that small farmers provided more than half the information on animal diseases and animal health issues received by the national veterinary authority. For another one-third of respondents, 10–50% of information originated directly from small farmers. Respondents from 10 countries reported that more than 80% of information originated from small farmers and these were: Burkina Faso, Czech Republic, Laos, Lithuania, Mauritius, Moldavia, Peru, Tajikistan, Uzbekistan, and Zambia.

Small farmers providing animal health information to the national veterinary authority differed significantly between low- and high-income countries; 49% of low-income countries reported that approximately 50% came from small farmers compared with 14% in high-income countries ( $p=0.001$ ). Between regions, more Asian and African countries reported small farmers as the primary source of surveillance information, but regional differences were not significant.

The majority of respondents indicated that small farmers had useful knowledge (62%), could identify common livestock diseases (64%) and had a lot of trust in public veterinary services (66%). The majority of respondents disagreed with the statement that most notifiable diseases are not reported (70%), but agreed that incentives are necessary to encourage reporting (70%) and that integrating small farmers is difficult (53%). The questionnaire did not specify the type of incentives used to encourage reporting (Figure 5).

Significantly more respondents from low-income countries agreed that small farmers trusted the public veterinary services than those from high-income countries (75% vs 55%,  $p=0.027$ ). Small farmers in low-income and high-income countries report the majority of notifiable diseases to national veterinary authorities, and this was significantly more likely in high-income countries (79% vs 60%,  $p=0.022$ ).

*Figure 5.– Attitude to involvement of small farmers in surveillance*



### **3.2.6. Factors underlying the involvement of small farmers in animal health services**

The questionnaire database comprised over 20,000 entries and factor analysis was used to detect underlying factors that might explain the variation in involvement of small farmers in animal health services. Factor analysis is a method for exploring underlying structure and hence simplifying a large number of variables into a smaller number of underlying factors. Factor analysis assumes data are normally distributed, and requires that data be present for most variables. Data which met these criteria were:

1. The number of trained veterinarians and private veterinarians;
2. The sum of the number of roles occupied by small farmers;
3. The sum of the number of agreements with statements supporting the involvement of small farmers and CAHWs in animal health service provision (e.g. they should be allowed to de-worm, give injectable medicines, etc.);
4. The sum of the number of agreements with statements displaying a positive attitude to small farmers (e.g. small farmers contribute to the economy, require special services);
5. The number of agreements with statements implying that small farmers are disadvantaged (e.g. literacy, gender, remoteness levels).

When these variables were introduced into a model, the results suggest three explanatory factors for the reported differences between countries on the involvement of small farmers in animal health services as follows:

1. High numbers of state veterinarians and a high number of roles for small farmers go together: the explanatory factor may lie in the concept of ‘public service’, meaning that a willingness to invest in state veterinarians and a willingness to involve small farmers reflect an underlying adherence to the concept of public service.
2. A belief that small farmers are disadvantaged goes with a positive attitude to small farmers. Although this may seem paradoxical, it possibly arises from the finding that where there is awareness of the disadvantages faced by small farmers, there is also greater appreciation of small farmers. This factor could be called ‘concern for small farmers’.
3. High numbers of private veterinarians and agreement with the involvement of small farmers and CAHWs in service provision (e.g. using injectables) are also associated. The underlying factor here may be one of libertarianism as opposed to statism/conservatism. This factor implies that where privatisation is not emphasised there may also be less willingness to allow other actors to participate in service provision.

### **3.2.7. Communication methods**

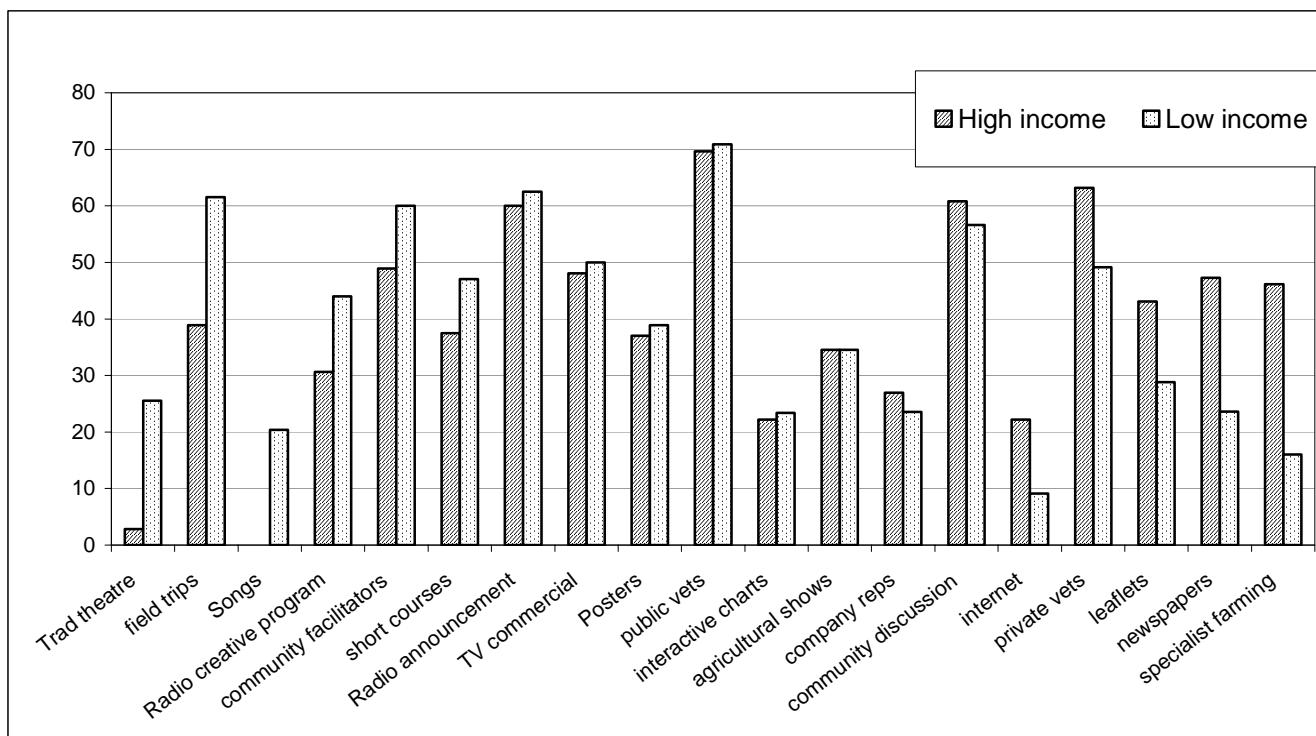
Overall, respondents indicated that a multiplicity of communication methods with small farmers was effective (Table 6).

Additional means of communication considered effective by some countries included outreach to primary school children (Uruguay, Venezuela), training community leaders (Cuba), personal communication (Haiti), involvement religious groups (Morocco, Venezuela), TV creative programming, videos and DVDs (Morocco, Oman, Portugal, Togo), university outreach (USA) and lectures (Sudan). Not surprisingly, songs and theatre and field visits were considered more important in low-income countries, and the internet, newspapers and specialist press in high-income countries (Figure 6).

Table 6.– Respondents rating of the effectiveness of different communication methods

<b>Role</b>	<b>% rating highly effective</b>	<b>% rating effective</b>
Public veterinarians	70	93
Radio announcement	61	93
Community discussion	59	87
Private veterinarians	56	96
Community facilitators	55	82
Field trips	50	89
TV commercial	49	91
Short courses	42	90
Posters	38	91
Radio creative programme	37	83
Leaflets	36	92
Newspapers	35	92
Agricultural shows	35	92
Specialist farming	31	86
Company representatives	25	87
Interactive charts	23	77
Internet	16	82
Traditional theatre	16	69
Songs	11	73

Figure 6.– A comparison of the methods of communication in high-income and low-income countries



### 3.2.8. Future prospects: small farmer involvement in national animal health and the possible OIE role

Overall, National Veterinary Authorities (79%) reported that the role of small farmers in national animal health should increase. Four main reasons for increasing their involvement were: the importance of small farmers; the challenges of implementing comprehensive disease surveillance and effective control measures without small farmer support; the perception that small farmers have less biosecurity than large farmers; and the decline of state veterinary services necessitating greater involvement of farmers. Of the remaining respondents, 20% reported that the role of small farmers should remain unchanged, and the respondent from the People's Republic of China reported that it should decrease, the rationale being that since joining the World Trade Organization in 2002, it was considered inevitable that the role of small farmers would become less important. Those respondents who reported that the role of small farmers should be increased, listed the following areas where this could be effected: capacity-building through training, communication, farmer field schools, extension, and field visits; programme design and implementation through actively involving farmers, providing incentives, and establishing self-regulatory systems; organisation of farmers into cooperatives, farmers associations, or farmers' groups. Community animal health care programmes were specifically mentioned by Lesotho, Sudan and Zimbabwe.

Ninety per cent of respondents suggested that the OIE should do more to involve small farmers in animal health, with the action of highest priority being the promotion of funding for programmes, followed by communication, and "new" standards (*Table 7*). Examples of 'new' standards were not reported.

*Table 7.– Priority of initiatives (%) suggested by respondents to the OIE for improving the role of small farmers*

	1st importance	2nd importance	3rd importance
Funding programmes	57	25	18
Communication	33	52	14
'New' standards	20	22	59

## 4. Conclusions

Small farmers have claims to the attention of state veterinary service providers: they are numerically the most important category of farmer, they offer special challenges to national biosecurity, and they are a major source of animal health information. Small farmers differ quantitatively and qualitatively from large farmers in animal health needs, capacity to participate and ability to influence national policy. These differences imply that special mechanisms are needed to maximise their participation in surveillance and sanitary measures. Respondents suggest that small farmers can best be reached through veterinarians (public and private), community engagement and radio programmes. Methods to include small farmers should take into account their knowledge, literacy and gender, and provide incentives to encourage participation.

Existing numbers of professional animal health service providers are small in relation to the needs of small farmers in many countries. Given a global average of 2.2 million small farms per country, the number of public veterinarians (global median of 200) is insufficient to address more than regulatory needs in some countries. Private veterinarians are concentrated in high-income countries, where many if not most are involved in small animal or equine practice. In low-income countries, there is a median number of just 139 private veterinarians. These figures suggest that public and private veterinarians cannot meet the needs of the small farmers without the involvement of other service providers. The generally positive attitudes towards paraprofessionals and CAHWs indicate that these were the preferred options to leveraging and extending the services made available by professionals to small farmers.

Although data on junior staff, trained community representatives, such as CAHWs, and lay service providers were often not reported in the sections of this survey concerned with documenting the numbers of service providers by category, informally trained and lay service providers are known to be common in many countries [12]. This suggests that the picture described by the statistics in this survey is not accurate as veterinary authorities apparently lacked the data to complete these items. To maximise institutional efficiency, outreach and availability of services, it is generally recognised that a pyramid based on a firm foundation of para-professionals or other trained intermediaries is required, with public veterinarians at the apex and increasing numbers of regulated service providers at the progressively lower levels. The first step

towards assuring such an appropriate institutional structure is to understand the situation at present. Once current formal and informal institutions are accurately perceived, an effective strategy for transitioning to more desirable animal health service institutions can be formulated. The OIE guidelines allow for para-professionals and trained community representatives (CAHVs) but require regulatory definitions of various categories of service providers, followed by procedures for their recognition, registration and enumeration ([13], Chapter 1.3.4, Article 14).

The perception of the role of small farmers in the provision of clinical veterinary services, including diagnosis, treatment and vaccination, varied greatly among national veterinary authorities. The standardised importance scores reported in this study for the role of public services in the delivery of vaccines and drugs for non-priority diseases indicate that some animal health programmes are apparently still guided by the premise that clinical services are a prerogative of the veterinarian, and the results indicate that some national veterinary authorities continue to see a role for the public sector in the control of non-priority diseases. On the other hand, many Member Countries responded to this survey by indicating that small farmers and their CAHVs had an important role in the provision of animal health services. From other studies a central role for farmers and other untrained community members in animal health care provision was reported by studies in Ethiopia, Kenya, India, South Africa and Zambia [14, 15, 16, 17, 18]. Given the large numbers of animals low number of veterinarians, and the financial unattractiveness of individual clinical services, it is inevitable that animal health treatments will be made by non-veterinarians. Even in developed countries, the reality is that farmers have a major role in cattle treatment. A large-scale study conducted in the USA by the national veterinary service found that 71% of beef producers give intramuscular injections to cattle [19]. A survey of Chief Veterinary Officers conducted in 1996 [20] indicated little support for the involvement of paraprofessionals and attributed the lack of support to the influence of professional bodies on official policy. The variation in perceptions noted in the present survey indicates that attitudes and paradigms concerning the involvement of small farmers and CAHVs are shifting towards greater recognition of their needs and potential to meet their own needs.

Sub-Saharan Africa with 14.9% of the world's farmers and 14.6% of the world's farm animals [21] has only 2% of the world's veterinarians. Yet, national regulations in many developing countries do not allow farmers to treat their own animals, and veterinarians often oppose auto-medication by farmers. These restrictions encompass valid concerns. As an example, in light of the risk of antimicrobial resistance, an OIE *ad hoc* Group on Antimicrobial Resistance recommended that antimicrobials should only be given by a veterinarian, or under the supervision of a veterinarian who has recent and personal knowledge of the animals to be treated [22] and this recommendation is now included in OIE guidelines ([13], Appendix 3.9.3, Article 3, point 12). The situation is that small farmer's activities in animal health are essentially outside of official regulation. The creation of 'black-markets' is a lose-lose scenario. The quantities of veterinary pharmaceuticals consumed in developing countries indicate that this is not a minor issue [11].

The gap between perception and reality suggests there is a need to review policy on participation of farmers in animal health services with the objective of creating win-win scenarios where both access to services and effective regulation is maximised. One of the encouraging trends observed in the survey was the willingness of national authorities to recognise the importance of small farmers, the need to review programmes in light of the needs of small farmers and the desirability of mobilising small farmers through incentives and training. Previous studies have noted that African veterinary services place much greater emphasis on small farmers as clients than do their European counterparts [20]. The variation in the responses to questions in the present study on the activities of small farmers and CAHVs (who are trained small farmers) indicated that African respondents were more likely to support the involvement of CAHVs in animal health and that low-income countries were significantly more open to the activities of CAHVs. This suggests that the need to work with small farmers in many developing countries has been perceived as a need to work through trained community representatives such as CAHVs. Such a transition to a more organised institutional framework for addressing small farmer's needs is in line with current OIE standards that provide for recognition of para-professionals including CAHVs as long as the role of such service providers is clearly defined in the national regulations, are auditable and provided under the supervision of a veterinarian ([13], Chapter 1.3.4 Evaluation of Veterinary Services).

One remarkable result of this survey was the clear recognition of the role of CAHVs in the delivery of animal health services. Forty-two per cent of all national veterinary authorities agreed that CAHVs should be permitted to administer vaccines. Of those countries reporting the presence of CAHVs, 69% indicated that CAHVs had a role in the administration of vaccines against priority diseases particularly for small animals and poultry. The control of rinderpest by CAHVs carrying out vaccination was one of the success stories of the Pan African Rinderpest Campaign where CAHVs played a principal role in the eradication effort [23]. To the authors' knowledge, this report describes the largest international survey of national

veterinary authority's perceptions on the participation of small farmers to date. It indicates that CAHWS have strong support as part of both public and private sector animal health activities.

The survey showed that 20% of respondents felt that the majority of notifiable disease outbreaks are not reported. There was considerable recognition of the importance of small farmers as a source of animal health knowledge and information. Small farmers are numerically the most important category of farmer, they tend to have lower levels of biosecurity and keep a diversity of species. Their involvement is key to effective surveillance. Yet public veterinary services find it difficult to integrate small farmers into surveillance systems. Participatory approaches to disease surveillance that directly involve small farmers have been shown to enhance the sensitivity of surveillance in a variety of national settings [24]. There was a strong indication (70%) that incentives are necessary, and studies are needed to identify what incentives would be most effective. It is important to clarify that sustainable incentives most often take the form of appropriate market policies that reinforce desirable behaviour rather than the distribution of cash or subsidised inputs or services. A starting point would be an assessment of progressive countries where small farmers were perceived to provide more than 80% of animal health information to identify the drivers of this level of participation.

The survey respondents clearly recognised the importance of small farmers in animal health programmes. They also acknowledged challenges in integrating them into animal health programmes and suggested ways of facilitating this, centred around capacity-building, review of policies and programmatic change. This is especially important given the consensus that the role of small farmers should increase. The great majority also believe that the OIE should do more to involve small farmers, with facilitation of funding programmes being the highest priority, followed by communication and revision of standards to better integrate the needs and opportunities posed by this important stakeholder group.

The observation that rinderpest was only mentioned by one country as a priority disease is both evidence of success and an important concern. The Global Rinderpest Eradication Programme is in its final stages and Member Countries should be completing important surveillance and documentation activities to validate disease freedom. The low priority placed on this disease at this critical juncture should be a concern to both international agencies and Member Countries that have invested heavily in eradication. Steps should be taken to assure an appropriate closure to this historic achievement in animal health.

The survey results indicate that the veterinary services and international agencies can provide leadership on options to enhance the participation of small farmers in animal health programmes. Specific areas for action are to:

- Review international standards, definitions and guidelines from the perspective of encouraging small farmer participation to create win-win scenarios and equity where appropriate,
- Review selected national experiences of the integration of small farmers into animal health programmes to identify positive lessons and provide guidance on methods to target programmes to small farmers by gender, literacy, remoteness and other factors,
- Provide guidance on stakeholder and animal health data collection in order to disaggregate data by farm size for strategic planning and policy formulation,
- Promote the sharing of experiences on incentives for integrating small farmers into surveillance activities and sanitary measures,
- Promote the principle of equivalence through evaluation of the validity of approaches tailored to small farmers in different local contexts leading to the development of data on the effectiveness and validity of such approaches to inform decision-making and the definition of standards,
- Facilitate veterinary services to increase their effectiveness and reach by adopting proven methods that are adapted to national conditions,
- Support CAHWS as a needed ally for veterinary services, veterinarians and small farmers.

One of the major messages from the survey was the diversity of perceptions regarding the nature of small farmers, their needs, their capacities and the opportunities for enhancing animal health programmes through their involvement. This implies that Member Countries will find a range of solutions to the issue of involving small farmers in animal health both to safe guard national production and to facilitate access to markets. It is important to bear in mind that OIE guidelines focus on outcomes and not methods as provided by the principle of equivalence in the Sanitary and Phytosanitary Agreement and the *Terrestrial Animal Health Code* ([13], Chapter 1.3.6 Guidelines for reaching a judgement of equivalence of sanitary measures). Provided the integration of small farmers into animal health programmes is done in a deliberate

manner that allows appropriate regulation and supervision, small farmers can play an important role in surveillance and animal disease control to the benefit of all stakeholders.

## References

- [1] Rosset P.M. (1999).— The multiple functions and benefits of small farm agriculture in the context of global trade negotiations. Food First/The Institute for Food and Development Policy, Oakland, CA, USA.
- [2] Nagayets O. (2005).— Small farms: current status and key trends. Future of Small Farms Research Workshop, Wye College, Kent, UK, June 26–29, 2005.
- [3] Huvio T., Kola J., Lundström T. (2005).— Small-scale farmers in liberalised trade environment. Proceedings of the seminar, 18–19 October 2004, Haikko, Finland. Department of Economics and Management Publications No. 38. Agricultural Policy. Helsinki: University of Helsinki, Finland.
- [4] Millennium Project Task Force on Hunger (2005).— Halving hunger by 2015: It can be done. United Nations Millennium Project Report. London and Sterling, Va., USA: Earthscan.
- [5] IFAD (2001).— Rural poverty report 2001: The challenge of ending rural poverty. International Fund for Agricultural Development, Rome, Italy.
- [6] IFAD (2004).— Livestock Services and the Poor. International Fund for Agricultural Development, Rome, Italy.
- [7] World Bank (2008).— <http://go.worldbank.org/D7SN0B8YU0> // Consulted 18 February 2008.
- [8] Loehlin J.C. (1987).— Latent variable models: An introduction to factor, path, and structural analysis. Hillsdale, NJ: Erlbaum Associates.
- [9] Heidhues F., Brüntrup M. (2003).— Subsistence agriculture in development: Its role in processes of structural change. In: Subsistence Agriculture in Central and Eastern Europe: How to Break a Vicious Cycle? Abele S. & Frohberg K., eds. Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 22. Halle, Germany: Leibniz-Institut für Agrarentwicklung in Mittel- und Osteuropa (IAMO).
- [10] de Haan C., Nissen N.J. (1985).— Animal Health Services in Sub-Saharan Africa. World Bank Technical Paper 44, World Bank, Washington DC, USA.
- [11] Umali D.L., Feder G., de Haan C. (1992).— The Balance between Public and Private Sector Activities in the Delivery of Livestock Services. World Bank Discussion Papers 163, World Bank, Washington DC, USA.
- [12] Mariner J.C., Paskin R. (2000).— Participatory Epidemiology: Methods for the Collection of Action-Oriented Epidemiological Intelligence, FAO Manual No. 10, FAO, Rome, Italy, 81 pp.
- [13] World Organisation for Animal Health (2007).— Terrestrial Animal Health Code, World Organisation for Animal Health, Paris, France.
- [14] Gehring R. (2005).— Veterinary drug supply to subsistence and emerging farming communities in the Madwike District, North West Province, South Africa. DVM thesis University of Pretoria. South Africa.
- [15] Tikue N.T. (2001).— Study on the occurrence of drug resistant trypanosomes in the cattle in the Farming in Tsetse Control Areas (FITCA) project in western Ethiopia. Masters thesis, Free University Berlin, Berlin, Germany.
- [16] Roderick S., Stevenson P., Mwendia C., Okech G. (2000).— The use of trypanocides and antibiotics by Maasai pastoralists. Trop. Anim. Health Prod., 32 (6), 361–374.
- [17] Van den Bossche P., Doran M., Connor R.J. (2000).— An analysis of trypanocidal drug use in the Eastern Province of Zambia. Acta Trop., 75, 247–258.
- [18] Deka R., Thorpe W., Lapar L., Kumar A. (2007).— Assam's pig sector: current status, constraints and opportunities. Project Report. International Livestock Research Institute, Nairobi, Kenya.
- [19] NAHMS (1997).— Part II: Reference of 1997 Beef Cow-Calf Health & Health Management Practices. National Animal Health Monitoring System (NAHMS), Veterinary Services, Animal and Plant Health Inspection Service, USA.
- [20] Ashley S.D., Holden S.J., Bazeley P.B.S. (1996).— The Changing Role of Veterinary Services: A Report of a Survey of Chief Veterinary Officers' Opinions. Livestock in Development, Somerset, UK.
- [21] FAO (2005).— FAOSTAT citation database results. <http://faostat.fao.org/faostat> // Consulted March 2007. Food and Agricultural Organization of the United Nations, Rome, Italy.
- [22] Anthony F., Acar J., Franklin A., Gupta R., Nicholls T., Tamura Y., Thompson S., Threlfall E.J., Vose D., Van Vuuren M., White D.G. (2001).— Antimicrobial resistance: responsible and prudent use of antimicrobial agents in veterinary medicine. Rev. sci. tech. Off. int. Epiz., 20 (3), 829–839.
- [23] Mariner J.C., Catley A., Zepeda C. (2002).— The role of community-based programmes and participatory epidemiology in disease surveillance and international trade. Invited keynote paper presented to the Workshop on Community-Based Animal Health and Participatory Epidemiology, Mombasa, October 2002.
- [24] Jost C.C., Mariner J.C., Roeder P.L., Sawitri E., Macgregor-Skinner G.J. (2007).— Participatory epidemiology in disease surveillance and research. Rev. sci. tech. Off. int. Epiz., 26 (3), 537–549.