The economics of the delivery of veterinary services

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Summary
Low livestock productivity in many developing countries is commonly considered to reflect, among other factors, the inadequate supply of services to control disease. Veterinary services have traditionally been provided by the state, but public finance constraints have limited the availability and effectiveness of public services. The author explains how economic theory can be used to identify alternative delivery systems (beyond the state) for providing animal health care and proposes new roles for the state and private sector in service delivery. The author highlights a number of barriers that currently limit the potential contribution of the private sector to service delivery, and describes a variety of approaches that have been used by the state to create an enabling environment for the private sector.

Keywords
Economics – Privatisation – Public and private sector roles – Service delivery.

Introduction
The effective delivery of animal health services is essential for disease control. Many parts of the world lack effective health care systems and as a result, disease continues to affect the livelihoods of livestock-dependent farmers (27, 22).

In many low-income countries, animal health services have traditionally been provided by the state. Initially, these public veterinary services were established to control exotic or epidemic disease, but most have subsequently used this veterinary infrastructure to deliver a range of additional animal health services. State veterinary services are usually heavily subsidised and have tended to depress private sector activity. As a result, the public sector continues to dominate service delivery in most developing countries (24).

Economic pressures have encouraged governments to reconsider the role of the public sector in the provision of services. The world recession in the 1980s heralded the onset of budget reductions for public services, including veterinary services. Falling budgets have greatly compromised the capacity of state veterinary departments and the quality of services has declined in many countries (1, 5, 13, 25).

Simultaneously, a shift in thinking has occurred regarding the role of the state. Some governments have started to question whether the state is indeed the most effective and efficient means of delivering services. A subsequent move towards privatisation has been the result, driven partly by budgetary pressures, but also by a growing belief that the private sector can deliver services more effectively than the public sector, even in the case of services where strong justification exists for public intervention (6, 13).

However, despite several years of privatisation, the role of the private sector in many developing countries has remained largely unchanged, and relatively little evidence has been reported to suggest that the delivery of veterinary services has improved (14). It is now recognised that the delivery of animal health services cannot be improved solely through privatisation. Instead, efficient service delivery requires a degree of ‘organisational pluralism’, where both the public and private sectors have roles to play in service delivery (9). Emerging literature from the field of New Institutional Economics suggests that it is achieving an optimal balance between public and private sector roles that governs successful service delivery (9, 10, 19).

This paper describes how the economic characteristics of livestock services can be used to identify appropriate roles for the public and private sector in service delivery. The paper is divided into three sections. The first section uses economic concepts of rivalry and excludability to identify appropriate public and private roles in the financing of veterinary services.
The second section then examines appropriate roles for the private and public sector in the supply of these services. The distinction between payment and supply is important as this opens the door to a number of hybrid arrangements between the public and private sector that can be used to improve service delivery (4, 11). The third and final section highlights a number of barriers that currently limit the potential contribution of the private sector to service delivery, and describes a variety of approaches that have been used by the state to create an enabling environment for the private sector.

**Economic framework for determining public and private roles in the financing of veterinary services**

Several authors have used economic concepts of excludability and rivalry (sometimes termed subtractability) to identify those services that can be financed by the private sector, and those that require public funding (3, 13, 24, 25). The definition of these economic terms is briefly reviewed below and these concepts are then applied to veterinary services to identify appropriate roles for the public and private sectors in the financing of veterinary services.

**Economic definitions**

a) Excludability considers whether the provider or consumer of a service can prevent (or exclude) others from simultaneously benefiting from the service.

b) Rivalry (or subtractability) concerns the extent to which the use or consumption of a good or service by one individual reduces the availability of this good or service to other people. High rivalry enables individual consumption, whereas low rivalry permits joint consumption.

Almost all services can be classified on the basis of 'rivalry' and 'excludability' attributes, as shown in Figure 1.

<table>
<thead>
<tr>
<th>Rivalry (or subtractability)</th>
<th>Excludability</th>
<th>Public goods</th>
<th>Toll goods</th>
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<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Public funding</td>
<td>Private finance</td>
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<tr>
<td>High</td>
<td>High</td>
<td>Common pool goods</td>
<td>Private goods</td>
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</table>

**Fig. 1**

Classification of services on the basis of excludability and rivalry attributes

Services with low excludability and low rivalry are known as public goods. Low excludability means that once produced, non-paying consumers cannot be prevented from using the service, whereas low rivalry means that several individuals may use the service at the same time. Examples of public goods are national defence or the maintenance of national law and order through the police force. Because everyone benefits from the service – including those who do not pay – the individual consumer has no incentive to pay for the service as they will benefit anyway (this is known as the 'free-rider' problem). Public goods are therefore usually funded through public means, using funds raised through taxes or levies.

At the opposite end of the spectrum are services with high excludability and high rivalry attributes (these are known as private goods). High excludability means that benefits accrue to the single consumer of that service and other consumers can be denied access to the service. High rivalry means that the service cannot be used by more than one individual simultaneously. Examples of private goods are the services provided by a plumber or an electrician: a plumber can only serve one user at a time and he or she can refuse to provide services to non-paying households. A strong incentive exists for the end-user to pay for private good services and as a result, the delivery of private good services can usually be financed by the private sector.

However, many services are neither public nor private, as follows:

- **Toll goods** are excludable, but have low rivalry, i.e. non-paying users can be denied access to the service, but several people may use the service at any one time. An example of a toll good is a cinema – several people can watch the film at the same time, but non-paying users can be denied access to the cinema. Other examples of toll goods are buses, trains and aeroplanes. Because of the high excludability characteristics, toll goods can usually be financed by the consumer.

However, some services with low rivalry may require large initial investment. The investment required might exceed the funds that can be raised by the private sector. The construction costs of a railway line for example may be so great as to deter private sector investment. In certain circumstances, public finance may be justified in order to establish the facilities and resources to produce the service, although the private sector may then finance the operation of these services.

- **Common pool goods**, on the other hand, have high rivalry characteristics (increased consumption diminishes supply for others) but are non-excludable (i.e. non-paying users cannot be prevented from using the service). An example of a common pool good might be a village water supply: no one can be prevented from using the water, but increased consumption of water by one individual (to irrigate his or her land perhaps) would reduce availability to others. Because non-paying users cannot be denied access to the resource, no incentive exists for the consumer to pay for the service (in this
Umali-Deininger et al. applied these concepts of rivalry and excludability to veterinary services to identify appropriate sources of funding for delivery (24). Veterinary services encompass a number of activities that range from food hygiene through to the therapeutic treatment of individual animals. The first step towards identifying appropriate sources of financing is to separate these veterinary services into individual services, and then categorise each service on the basis of excludability and rivalry attributes. In practice, few veterinary services are purely public or private goods, most contain elements of each. Thus, some services may have a high private good element but at the same time confer significant public benefits. For example, the control of ticks on a single farm may benefit not only the owner but also neighbouring farmers who benefit from lower tick populations in the area. Despite these spillover effects, the largest proportion of the benefits associated with tick control are gained by the farm that has paid for the control measures. Tick control can thus be considered as being partially (but not totally) excludable. Veterinary services are therefore usually categorised according to the main or overriding attribute of the service (Fig. 2).

### Characteristics of veterinary services

<table>
<thead>
<tr>
<th>Excludability</th>
<th>Public goods</th>
<th>Toll goods</th>
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<tbody>
<tr>
<td>Low</td>
<td>– Epidemic or zoonotic disease control (including surveillance, movement control, quarantine services) – Some extension – Control of food-borne diseases – Drug quality control</td>
<td>– Vaccine production – Diagnostic services – Veterinary clinics – Dips</td>
</tr>
<tr>
<td>High</td>
<td>– Tsetse control on communal land using traps, targets or aerial spraying</td>
<td>– Endemic disease prevention and control – Sales of drugs and vaccines – Some extension – Some research</td>
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Fig. 2

**Services that should be financed publicly**

Some veterinary services have low rivalry and/or low excludability attributes that deter private sector financing. These include services with strong public good characteristics (i.e. low rivalry and low excludability) or services that are common pool goods (i.e. low excludability).

Veterinary services with a strong public good element include services to control epidemic or zoonotic diseases (including movement control, quarantine and disease surveillance and diagnosis). There may also be positive externalities associated with a diagnostic service, which can provide an early indication of the outbreak of epidemic disease. These benefits may not be fully valued by an individual farmer and this can lead to under-utilisation of the diagnostics services. Some public sector intervention may therefore be justified – for example through the use of subsidies or vouchers – to lower the cost of diagnosis and so encourage farmers and providers of clinical services to submit samples to the laboratory. The principal criterion used to define public versus private sector financing in disease control is the degree of exteremity associated with the disease, and where that externality occurs. Exteremities are spillover effects from disease control that can arise when the control of a disease (or lack of it) results in a significant benefit (or loss) to the wider population (in other words, the benefits of the control of epidemic disease are non-excludable). The degree of externality associated with a disease will depend on the nature of the disease (mainly in terms of rapidity of infection) and the relative levels of...
occurrence of the disease on different sides of various local, regional and national boundaries.

Epidemic diseases can rapidly spread into previously uninfected areas and cause significant economic loss to the wider population if uncontrolled. High externalities are associated with the control of such diseases and as such, disease control can have a high public good element. The costs of control to the individual with the disease outweigh benefits (particularly if costs include compulsory slaughter) so no incentive exists for individuals to control the disease. Under these circumstances it may be valid for government to finance the control of epidemic diseases. The control of endemic disease, on the other hand (through vaccination or other means), has minimal externalities and as such is considered a private good.

Meat and food hygiene services have traditionally been considered as public goods as the state benefits through lower health care costs (it is generally assumed that the public would rather risk eating potentially contaminated products than pay for food hygiene services, although this assumption is now being challenged in many countries). Drug quality control is also considered a public good.

Extension and research services may be either public or private goods depending on the method of extension or type of research (4). Most types of information or research outputs have low excludability (i.e. the service can be readily shared between users) and low rivalry (the use of information or technology by one person does not diminish availability to others). However, many input suppliers are willing to provide information to farmers if doing so will promote the use of their products. In this case, the extension can be financed by the private sector. Where no commercial gain can be achieved from the supply of information, then the service becomes a public good. An example of public good extension might be the dissemination of independent and unbiased information on the use of drugs. Most pharmaceutical companies encourage farmers to treat adult animals against intestinal parasites, although the benefits of such treatment are questionable. In this case, information on correct use of anthelmintics becomes a public good.

Tsetse fly control through either spraying or the use of traps or targets on communal land is mainly a common pool good. In these situations, it is difficult to exclude non-paying farmers from grazing animals on communal land that has been cleared of tsetse flies – and yet the quantity of tsetse-free grazing will diminish with an increase in users. Tsetse fly control through spraying or traps/targets on communal lands can only be financed through either public or collective action sources.

The dynamic economic nature of services
The economic characteristics of a service are not static. The rivalry and excludability attributes of a service can change over time with the development of new disease control technology, or with changes to the regulatory and information environment within which services are delivered; these three aspects are discussed below.

Technology
Technology for controlling diseases influences the ‘excludability’ characteristics of disease control. Tsetse control through aerial spraying for example is a public good because all farmers benefit from the service regardless of whether every individual has contributed to the cost of the spraying or not. The development of drugs, and ‘pour-on’ insecticides has changed the control of trypanosomosis in endemic areas from a public good to a private good as the benefits of control can now be limited to those who choose to use the drugs or insecticides. This means that the justification for public funding for a given disease control programme can alter in response to the development of new technology, and that the state should continually review and update disease control policy to ensure that the policy is consistent with contemporary technology.

Information campaigns
Information campaigns can be used to raise public awareness of the health risks associated with the consumption of untreated livestock products. Demand for livestock products that are sold through regulated channels generally rises once the consumer is informed of the benefits of such regulation, and consumers are usually willing to pay a price premium for food products that have been produced to higher food safety standards. The price premium allows food processors to pay for the food hygiene services that might otherwise have been financed by the state. Similarly, once informed, consumers are usually willing to pay a price premium for certified veterinary drugs, thus enabling drug certification to be privately financed.

Regulation
Regulation can compel consumers to purchase services that they might otherwise seek to avoid. Regulation regarding food processing standards, for example, transfers the responsibility of protecting public health from the state to the food industry. The costs of maintaining food safety standards are in turn reflected in the prices of the product to the consumer, thus ensuring that the beneficiaries – in this case the consumer – pay for the food hygiene service.

Regulation can also be used to introduce levies on livestock products as a means of financing public good services that primarily benefit the livestock industry. In the United Kingdom (UK), for example, a levy on pigs financed the control and eradication of Aujeszky’s disease – an epidemic disease which has relatively high externalities associated with its control.

Regulation regarding property rights can alter the attributes of a service from low excludability to high excludability, thus permitting private sector finance. Property rights in the form
of patents, for example, have been a valuable tool for encouraging private sector finance of research, as patents ensure that the inventors of new technology receive a proportion of the proceeds from the sale of that technology. Property rights can also be used at a community level as a means of managing common pool goods. Some communities have now started to develop (and enforce) locally devised rules for community tsetse control programmes.

Implications for the role of the private sector in financing service delivery

The analysis of the rivalry and excludability characteristics of a service indicates that many types of veterinary services are amenable to private sector financing (Table I). This opens up the possibility of moving scarce government resources away from the delivery of private and toll good services and redirecting these resources in order to provide an appropriate level of funding for public and common pool good services. The role of the private sector in financing services need not stop at those services with private or toll good characteristics. The state may encourage private financing of the delivery of public or common pool services through the judicious use of information and regulation, whilst technological developments may change the nature of disease control from a public to private good. Thus, considerable opportunities exist to overcome the fiscal constraints that currently limit the quality of veterinary services in many developing countries.

Economic framework for identifying appropriate public and private sector roles in the delivery of services

Many of the problems facing service delivery concern inadequate public financing. The preceding section demonstrated how economic theory can be used to identify those services that could be financed by the private sector, allowing the scarce resources of the state Veterinary Services to be focused on the provision of public good services.

A second approach that can be used to improve veterinary services is to examine the role of the private and public sector in the supply of veterinary services. As previously noted, in many countries the state remains the predominate provider of veterinary services. However, a growing body of empirical evidence exists in other sectors to suggest that the private sector is able to supply services more efficiently and effectively than the public sector, irrespective of the economic nature of a particular service. Large gains in cost-effectiveness, efficiency and quality of services have been noted following the privatisation of public services such as telecommunications in Latin America (15), or gas and electricity supplies in Europe. Similar gains in efficiency have been noted in the animal health sector (5); some examples are as follows:

a) In Zimbabwe costs of tsetse fly control are estimated to be 35% lower for private sector delivery compared to government delivery (21). Similar benefits have been estimated in Botswana.

b) In Morocco the delivery of vaccination services by private suppliers on contract to the government has led to a 40% reduction in costs and a 27% improvement in vaccination coverage (25).

c) Drug availability and use per animal unit is significantly higher in countries that have privatised drug importation and distribution (Cameroon, Central African Republic, Côte d'Ivoire, Ghana, Mali, Senegal and Kenya) compared to those that retained government monopolies (Benin, Burkina Faso, Chad, Mauritania, Niger and Rwanda) (5).

Two main reasons can be provided to explain why the private sector can outperform public organisations. Firstly, private sector organisations tend to have greater flexibility over the management of the resources of the organisation, compared to public organisations (including setting terms and conditions for staff). Unlike the civil service, the private sector is able to adjust staff numbers according to needs. This means that a more rapid response to changes in market demand is possible. Secondly, unlike public organisations, private sector providers must compete with each other to win the custom of a user. Competition encourages organisations to reduce prices and improve the quality of services by managing resources more efficiently.

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Table I
Sources of finance for different types of veterinary services

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Table I
Sources of finance for different types of veterinary services
However, the relative efficiency of the private sector can be greatly reduced if competition between service providers is lacking, or if consumers are unable to assess the quality of the services received. The presence of either or both of these conditions can lead to 'market failure' – a condition which has often been used to justify state delivery of private good services. The state can, however, intervene in other ways to remove the causes of market failure. Regulation may be used to set conditions of competition, pricing and quality standards, and provide information to the consumer on the quality of services provided by different private sector suppliers (9).

As shown in Table II, the theory suggests that appropriate public and private sector roles in the supply of services might include the following:

a) The private sector supplies all private good services, including clinical services, drugs sales and vaccination against endemic diseases. The state can support the efficient operation of the private sector by setting, monitoring and enforcing standards for service delivery, and making this information available to the public.

b) The supply of toll good services such as vaccine production units, diagnostic laboratories, veterinary clinics and dipping facilities can also be managed by private organisations, although the facilities (if financed by the public sector) may still be owned by the state. Collective action organisations can also provide services for which there is no competition as these organisations will act in the interests of members, and so avoid the problems associated with monopolies. (Collective action organisations are sometimes known as the third sector) are organisations financed and managed by their members. They are able to use their collective power to finance the establishment of toll good services and are able to recover costs through membership fees or through deductions on products sold by members through the organisation.

c) Common pool goods such as the control of tsetse fly on communal lands could be managed by collective action organisations as these organisations are often better able to monitor and regulate the behaviour of their members than public sector organisations.

d) Public good services such as the control of epidemic or zoonotic diseases (including movement control, quarantine and disease surveillance), food hygiene inspection, drug quality control, research and extension, may be supplied by the private sector on contract to the state Veterinary Services. The government can control the quality of services through the use of licensed veterinary inspectors (private veterinarians who have been certified as suitable for conducting business on behalf of government). If a veterinarian fails to match standards set by the government, then his or her licence can be rescinded. The state retains a role in the planning of the delivery of public good services and the management of private sector contracts. This will usually involve monitoring private sector performance through, for example, surveys that measure sero-conversion levels.

Implications for the role of the public and private sector in the supply of services

Economic theory suggests that the efficiency and effectiveness of veterinary services are likely to improve if the private sector is used to supply both private and certain public good services. Private sector supply implies a new and different role for the public sector. Rather than supply the services, the public sector would instead adopt a new responsibility of ensuring the efficient functioning of the market. This can be achieved by providing checks and balances to the private sector through the judicious use of regulation (some examples of regulations include property rights, conditions of competition, pricing and quality standards, etc.)

Table II

<table>
<thead>
<tr>
<th>Public and private sector roles in the delivery of veterinary services</th>
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synergies between the public and private sector whilst at the same time capitalising on the comparative advantages of each sector.

Creating an enabling environment for the private sector

Economic theory suggests that the private sector should play a major role in the financing and supply of veterinary services. However, in many developing countries the transfer of responsibilities from the public to private sector is inhibited by - among other things - a weak and poorly developed private sector. Experience suggests that state withdrawal from the provision of services can create chaos if no private sector exists to assume responsibility in delivery. In Kenya, for example, the privatisation of dipping services led to the collapse of over half of dips in the country, in part because no private sector operators were able to assume responsibility for providing the service (12).

The state can play a pivotal role in creating an 'enabling environment' for the private sector, although to date this is an area that has commonly received relatively little attention in reform programmes (14). The failure to create an enabling environment for the private sector has been an important factor that has limited the successful privatisation of veterinary services (23). A variety of approaches that can be used by the state to stimulate the development of the private sector will be presented below.

Legislative reform

For the private sector to perform effectively, conditions of 'free entry and exit into the market place' must exist. 'Free entry' refers to the presence of barriers that deter or prevent the establishment of a private sector, whereas 'free exit' concerns the level of protection given to the private sector to allow suppliers to maintain their position in the market place (9). The private sector operates optimally when restrictions to entering into private practice are minimal, and once operating in the private sector, no protection is afforded to inefficient suppliers to protect these suppliers from bankruptcy (i.e. there should be 'free' exit).

In practice, considerable 'entry barriers' exist for the private sector. Some countries have legislation that prohibits private sector activity, and new laws and by-laws are required to legalise private veterinary practice (23). Legislation that governs rights to use drugs and vaccines may also need to be revised to ensure that private veterinarians are able to provide a wide range of services. For example, some countries prohibit the sale of vaccines through private channels, thus reducing the potential source of income to private practices.

A formidable entry barrier to the private sector is the issue of professionalism, where rights to treat animals are limited to veterinarians. This has raised the price of clinical services beyond the purchasing power of small-scale farmers, reduced competition and restricted the development of private practice to high-value markets in peri-urban areas (14, 28).

In some regions – particularly marginal pastoral areas – these rules have been relaxed and lower-grade professionals have been allowed to operate in a private capacity. Although para-professionals cannot substitute for veterinarians, these personnel are able to provide a cheap, locally-available basic health care service that can lead to quite dramatic improvements in herd health (Appendix I).

The presence of low-grade professionals (sometimes known as community based animal health workers or CBAHWs) can also greatly improve the early detection of disease outbreaks and the supply of vaccination campaigns. For example, CBAHWs have played a key role in the control of rinderpest in southern Sudan, and epidemic disease control in Somalia, Afghanistan and Kenya.

Early indications are that private veterinarians greatly benefit from associations with CBAHWs. In Madagascar, for example, private veterinarians use retrenched government veterinary field assistants to vaccinate animals in their locality. This enables the private veterinarian to cater for large numbers of animals which renders the practice financially viable (2).

Some countries are reconsidering rules regarding rights to practice. Uganda, for example, is revising legislation in recognition of the role played by para-veterinarians and CBAHWs in rural service delivery. By legitimising the activities of these service providers the state will be better able to monitor and sanction malpractice. The formation of a para-veterinarian association will also aid the enforcement of professional standards, and encourage the formation of links or associations with veterinarians.

State withdrawal

Perhaps the biggest barrier to private sector development is the continued delivery of veterinary services by the public sector (17). Private sector providers are unable to compete with the subsidised services and as a result usually prefer to seek government employment. The private sector is consequently often very small (or non-existent) in countries where state services provide private good veterinary services.

One of the most important stimuli to private sector development in many countries has been the withdrawal of the state from the delivery of private good services (it is notable that the two sectors that have traditionally been ignored by the state services – the poultry and pig industries – have generally well-developed private sector delivery systems) (16). The impact of state withdrawal on private sector
development has been demonstrated in war-torn countries where state Veterinary Services have collapsed altogether. In the place of state services, a thriving private sector often emerges, providing services that previously were considered the domain of the public sector. In Afghanistan, for example, the private sector regularly vaccinates against contagious diseases such as anthrax – a service previously provided by government – and in Somalia a flourishing private sector business has developed in brucellosis testing to facilitate the export of animals to Saudi Arabia (Appendix II).

In practice, many state Veterinary Services have found withdrawal from service delivery difficult because low civil service wages force staff to supplement incomes through the sale of veterinary services. In some countries, government veterinary officers claim to earn up to 80% of their income from the sale of veterinary drugs and treatments. As a result, many private veterinarians in Africa continue to complain of unfair competition from government veterinarians.

The problem can be partly resolved through an overall reduction in the number of public veterinarians, and the proper remuneration of remaining public servants. In Kenya, for example, a halt in recruitment of veterinarians over a period of four years gave rise to the establishment of over 150 private veterinary practices (against a previous total of 4) (28).

Alternatively, the state can ensure a 'level playing field' by charging full cost recovery to ensure fair competition. Cost recovery is popular with many state Veterinary Services as it provides a ready solution to budgetary problems. In practice, full cost recovery is difficult to implement because, firstly, few state services know the true costs of providing a particular service and secondly, farmers are usually unwilling to pay for government provided services, arguing that they have already paid for the service through taxes. Cost recovery should therefore be viewed as a step towards transforming public services into private services. Cost recovery has been successfully used as a tool for preparing public sector organisations for eventual privatisation, as was the case for extension services in the UK (Appendix III).

**Contracting-out**

An important development in the reform of livestock services has been the separation of finance from supply, and the realisation that whilst government may continue to provide funding for public services, the supply of these services may be contracted out to the private sector.

One of the most successful options for fostering growth within the private sector is to contract out the supply of publicly funded services to the private sector. Not only does this lead to an improvement in the efficiency and effectiveness of the service, but a vital stimulus to the private sector is also provided, enabling veterinarians and support staff to establish practices in rural areas which otherwise could not support a veterinary practice.

In America, for example, up to 50% of private rural veterinarians were initially supported economically by part-time contract employment by the government to test livestock for tuberculosis and other diseases of national public concern, and to inspect farms as part of official government disease control programmes (18).

Morocco is a commonly cited example of a country where government contracts have helped private practice establish in rural areas. The use of sanitary mandates contributes some 40% of practice income and has facilitated the establishment of private practice in some 60% of districts. The number of private veterinarians has risen from 2 in 1982 to 130 in 1993 (8).

**Credit**

Special financial incentives can be used to encourage publicly-employed veterinarians and new veterinary graduates to set up private practices. Many countries have introduced special credit schemes to encourage new entrants to the private sector. Soft credit concessions have been a useful tool to encourage private sector growth in Kenya, for example, where new veterinarians have established practices with the help of a European Union funded credit scheme. Community-based animal health workers have also been assisted by the provision of a free drug kit (and in some cases a bicycle) to help establish a business.

In some cases, services with toll good characteristics such as clinics or dips may need to be financed by the state, but managed by the private sector. These facilities can be awarded on a competitive basis to the private sector, with management contracts reviewed periodically to ensure competition between service providers.

**Supporting collective action organisations**

Farmers organisations can play a valuable role in the financing and delivery of a range of toll good services. Dairy cooperatives in particular often have a sufficiently large capital base to be able to provide toll good services such as diagnostic laboratories and veterinary clinics (e.g. veterinary clubs in New Zealand, Appendix IV). Examples of veterinary services provided through dairy cooperatives can be found in Kenya (5), India and Indonesia (25).

Pastoral associations have been particularly successful in providing veterinary drugs and health care services in remote areas that might not otherwise attract private practices (20).

Mutual insurance groups – where members pay an annual fee in return for free veterinary services – can provide sufficient financing for the establishment of clinical and diagnostic services. The most successful example of mutual insurance is found in Israel (Appendix V), but other examples often exist at a village level. For example, reports exist of small-scale farmers in Zimbabwe forming an insurance scheme as a means of protecting individual farmers against unforeseen
losses to disease. Farmers are compensated for the loss of an animal providing he or she has demonstrated adequate care for the animal. The profits of the scheme are used to fund services provided by an animal health care assistant.

Farmers associations can also provide a means of overcoming the externalities associated with the control of epidemic disease, and avoiding free-rider problems that might be associated with public good services such as disease surveillance. In Bolivia, for example, members of an association of cattle producers finance private veterinarians to control foot and mouth disease. This programme has been successful in eradicating the disease in areas where farmers are well organised, but has encountered problems in controlling the disease in mountainous areas where farmers are not members of any organisation. The proposed solution to this problem is to post animal health assistants in areas where infection remains. Other examples of the control of infectious disease through organisations of farmers include the eradication of Aujeszky's disease from the UK (Appendix VI), and the financing of disease surveillance in Denmark (Appendix VII). These examples highlight how government and producer organisations can form effective partnerships to finance and deliver a public service.

Government (or non-governmental organisations) can play a valuable role in stimulating the development of farmers organisations through the provision of training, the introduction of cooperative rules, and the use of legislation to enforce the collection of levies (Appendix VIII). Oxfam, for example, has helped establish pastoral associations in East and West Africa through a programme of training and community mobilisation. In Zimbabwe, the commercial farmers union relies on government legislation to make the collection of cess or levies compulsory, and in Kenya, credit concessions have aided the formation of such groups throughout the country.

Conclusion

Economic theory suggests that the delivery of veterinary services can be improved by redefining the role of the public and private sectors in the financing and supply of services. Most types of veterinary services are amenable to private sector financing, through either 'user pays' fees or levies applied to the livestock industry. The private sector can thus play a valuable role in overcoming the financial constraints that currently limit the quality and availability of services in countries where state delivery predominates. Economic theory also suggests that the private sector should play a lead role in the supply of services, including the provision of public good services on contract to the state, and experience suggests that considerable gains in effectiveness and efficiency result when greater use is made of the private sector.

The analysis presented in this paper suggests that the state should ultimately withdraw from financing and delivering a range of private and toll good services, including clinical services, the sale of drugs and vaccines, the control of endemic disease through vaccination and dipping, the provision of diagnostic services and the supply of some types of information. Even the poorest groups can afford the purchase of private goods – providing the rules governing service delivery do not raise the cost of services beyond the purchasing power of the poor.

Government should focus on the control of epidemic diseases through the use of sanitary mandates, quarantine services, movement controls, compulsory slaughter, disease surveillance, vaccination or vector control. Other public services include some types of research and extension, drug quality control and food hygiene inspection. Many of these services may be financed through 'user pays' fees or levies raised on the livestock industry, and the delivery of public good services may be contracted to the private sector.

The state services will assume a new responsibility of creating an enabling environment for the private sector through the use of credit, sanitary mandates, and legislative reform that reduces barriers to private supply, and facilitates the formation of collective action groups. Of foremost importance is the need for the state to withdraw from the delivery of private good services.

For many countries, the use of the private sector in the delivery of veterinary services represents a considerable shift in responsibilities between the public and private sector. These new roles for the state represent a radical departure from the past and will have considerable implications for the organisation and staffing of state services. The challenge facing state veterinary services is how this transition towards greater private sector engagement in service delivery can be managed.

Acknowledgement

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Aspects économiques de la prestation de services vétérinaires

S. Holden

Résumé
La faible productivité des élevages dans nombre de pays en développement est considérée comme révélatrice, entre autres facteurs, de l’inadéquation des services destinés à lutter contre les maladies. Les services vétérinaires ont été traditionnellement assurés par l’État ; or les contraintes budgétaires sont telles que la disponibilité et l’efficacité des services publics finissent par en pâtir. L’auteur montre comment la théorie économique permet de définir des systèmes de prestations de services zoosanitaires alternatifs (non étatiques) et propose, en outre, de nouveaux rôles pour l’État et le secteur privé dans ce domaine. Il cite un certain nombre de barrières qui limitent actuellement la contribution du secteur privé à la prestation de services et décrit les différents moyens utilisés par l’État pour créer un environnement favorable au secteur privé.

Mots-clés
Économie – Prestations de services – Privatisation – Rôles des secteurs public et privé.

Aspectos económicos de la prestación de servicios veterinarios

S. Holden

Resumen
Es opinión muy extendida que la baja productividad del ganado en muchos países en desarrollo obedece, entre otras cosas, a la prestación inadecuada de servicios sanitarios. Aunque tradicionalmente el Estado ha sido el responsable de los servicios veterinarios, la penuria de las finanzas públicas ha mermado tanto la disponibilidad como la efectividad de los servicios públicos. El autor describe el uso de la teoría económica para hallar sistemas alternativos (no exclusivamente estatales) para la prestación de servicios de sanidad animal, y propone nuevas funciones en este ámbito tanto para el sector público como para el privado. Tras destacar una serie de factores que obstaculizan hoy en día la participación del sector privado en la prestación de servicios, describe distintas soluciones adoptadas por los Estados para crear un entorno favorable al sector privado.

Palabras clave
Economía – Funciones del sector público y el privado – Prestación de servicios – Privatización.
Appendix I

The use of community based animal health workers in Kenya (12)

In the Tsavo region of Kenya, the mortality rate of cattle reared in villages with a community based animal health worker (CBAHW) is on average 40% lower than those in neighbouring villages without access to CBAHW care (Table A). Farmers value these services more highly than those provided by the state veterinarian as the services of a CBAHW are readily available and considerably cheaper than those of the state veterinarian.

Table A
Effect of community based animal health workers on livestock mortality and sales that are associated with ill health on 77 farms in Kathakani, Kenya, 1997

<table>
<thead>
<tr>
<th></th>
<th>Mortality rates due to ill health</th>
<th>Sales/slaughter rates due to ill health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cattle</td>
<td>Sheep/goats</td>
</tr>
<tr>
<td>With CBAHWs</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Without CBAHWs</td>
<td>19%</td>
<td>22%</td>
</tr>
</tbody>
</table>

CBAHWs: community based animal health workers

Appendix II

Disease diagnosis in North East Somalia (26)

The export of live sheep and goats to Saudi Arabia is the mainstay of the economy of North East Somalia. It provides employment for 60% of the population and generates 80% of export earnings. All animals exported to Saudi Arabia must be certified free of brucellosis and are randomly tested on arrival in Saudi Arabia. A shipment of animals will be rejected if one animal is infected. Thus, a strong incentive exists for exporters in Somalia to ensure that the animals exported are free of the disease.

In the absence of a state Veterinary Service, a large private sector brucellosis testing industry has developed in North East Somalia to facilitate the export of sheep to Saudi Arabia. During 1992, at Bossaso, the main port, one veterinarian and two assistants tested some 41,000 animals for brucellosis each month. Sampled animals are marked so that positive cases can be identified. Each consignment of sheep and goats is then issued with a certificate stating that the animals have passed the brucellosis test and show no clinical signs of disease.

This system appears to work: it is now rare for a cargo of animals to be rejected on the grounds of testing positive to brucellosis. However, exporters may suffer from the lack of state veterinary authority. There are suspicions that the Somali exporters are subject to discrimination by the authorities in Saudi Arabia who may reject shipments of animals on allegedly spurious grounds. Somali traders do not have a higher authority who can defend their interests in the face of alleged trade discrimination.

Each test costs 1,000 Somali Shillings (SOS). The brucellosis team in Bossaso was thus able to raise some US$17,800 in three months alone (US$1 = SOS7,000; 1992 exchange rate).
Appendix III

Privatising extension services in the United Kingdom

Extension services in the United Kingdom were gradually privatised through the following:

a) the introduction of cost-recovery
b) the formation of an agency leading to
c) full privatisation.

Agency status required the development of a five-year strategic plan for the extension services and an annual business plan, both of which had to be agreed with the parent organisation, the Ministry of Agriculture, Fisheries and Food (MAFF). Performance indicators were agreed with MAFF each year and these were used to monitor progress.

The extension services reorganised staff on a team basis and managers of the teams received particular training on the management and motivation of staff. The transition from a public organisation to a private enterprise is a complex process and outside help and support are needed, as the cultural change required within the organisation, and by its management, can be great.

Appendix IV

Veterinary clubs (9)

In New Zealand, to attract private veterinarians to rural areas, local dairy cooperatives (and later the government) provided clinical facilities and guaranteed veterinarians a minimum income. Known as veterinary clubs, the system was successful in establishing private veterinary practices in most rural areas of New Zealand. By providing clinics, and guaranteeing a minimum income level, the clubs:

a) removed the risk associated with establishing a veterinary practice in a new area where demand for veterinary services was unknown
b) were able to avoid problems of monopoly suppliers as the contract with the tenant could be reviewed at any time.

Many veterinarians have now ‘contracted out’ of the club. Under this system, practitioners use all the club facilities and guarantee to supply members with clinical services at agreed prices, but receive all the proceeds themselves. In some cases, the veterinarians have bought out the club completely. To date, some 40% of private practices either operate as a club or as companies contracted to the club (9).

Appendix V

Mutual Society for Clinical Veterinary Services and Livestock Insurance in Israel Ltd (HACHAKLAIT) (7)

HACHAKLAIT originally formed to provide members with livestock insurance. In order to minimise the number of claims, the society also provides veterinary services to members. The society now claims 1,846 members with a total of 184,940 dairy animals (90% of the national herd), 31,036 beef cattle, 36,718 sheep and goats and 1,266 horses.

Payment of an annual fee entitles members to unlimited veterinary care. Fee rates vary according to the animal species and size of herd or flock. Veterinary services cover treatment of clinical cases, routine examinations, consultancy services and some diagnostic support. Farmers pay for drugs supplied through HACHAKLAIT at cost price.

The services are provided by private veterinarians on contract to the society or by veterinarians employed directly by the society. The society buys the drugs in bulk at discount prices from commercial drug companies.
The average monthly fee for a dairy cow as at January 1997 was 8.77 Israel New Shekels (ILS) and for a sheep, ILS1.5 (ILS1 = US$0.25, as at 20 May 1999). Fee rates vary according to management. Thus, for a calf, the monthly fee rate of ILS4.74 is reduced to ILS2.15 if the calf is reared in a feedlot.

The society now only offers a 'catastrophe' insurance to farmers. This policy insures all losses above 8% of the value of the entire herd in a given year. Yearly premiums are set at 0.4% of the herd value.

Appendix VI

Eradication of Aujeszky's disease: an example of a successful public/private sector partnership in the United Kingdom (19)

In 1981, an outbreak of Aujeszky's disease occurred in the pig industry of the United Kingdom. The Government refused to pay for the eradication of the disease, but offered to help the industry, providing the producers met the compensation costs incurred through compulsory slaughter of animals. Initially, the industry decided not to embark on the eradication programme. However, as the disease began to spread, and information on the costs and benefits of eradication became available, this decision was reversed. Some two years later, in 1983, an agreement was reached between the Government and the pig producers to control the disease.

A Pig Disease Eradication Fund (PDEF) was established to coordinate the financing and control of the disease. A levy of £0.3 per head was raised on all pigs destined for slaughter or export. The levy covered the compensation costs incurred through the compulsory slaughter of animals. The funds were collected by the Meat and Livestock Commission acting under the authority of the Pig Industry Levy Act 1983 and transferred to the PDEF Ltd for compensatory payments to producers with affected herds. A total of £27 million was raised through the levy and over 522 herds slaughtered during the eradication scheme. All other costs associated with the scheme, including administrative, veterinary and laboratory resources, were borne by the Government.

By 1989, the disease had been eradicated and the levy disbanded (19). Interest on residual funds from the levy contributes towards ongoing serological surveillance required to establish disease free status. The mechanism for collecting the levy remains in place, should it be required again in the future.

Appendix VII

Disease monitoring in the swine population of Denmark: an example of industry-funded surveillance

In Denmark, 75% of pork production is export orientated. A high zoosanitary status is crucial for maintaining market shares. Suspicion of infection in exports can quickly lead to a ban on exports. Ensuring that stock for export are disease free is therefore in the interests of the industry.

Some 98% of all pigs slaughtered originate from farms and abattoirs organised in the Federation of Danish Pig Producers and Slaughterhouses (DPPS). The DPPS is responsible, in cooperation with the State Veterinary Service (SVS), for the continuous monitoring of disease incidence and prevalence in swine herds in Denmark. The programmes are primarily financed by the DPPS, with some grant aid assistance from the European Union. The SVS provides a free diagnostic service for notifiable diseases.

The DPPS has three surveillance programmes, as follows: a) the monitoring and follow-up of imported live pigs b) a meteorological and geographical surveillance for airborne infections c) herd health and productivity recording.

The meteorological surveillance makes use of government-funded meteorological stations, although the DPPS maintains one meteorological station. All pig herds are visited by a private veterinarian every four months and clinically
inspected for notifiable diseases. Herd health and productivity data is also collected from some 55% of pig producers who voluntarily participate in an efficiency control system. In addition, data from slaughterhouses are collected.

The DPPS imposes special quarantine and testing procedures (in addition to those conducted by the SVS) on all imported pigs. Only pigs raised in Denmark are slaughtered at export plants. The SVS has made ear-tagging and registration on a database a statutory requirement. Only 'approved' farms are allowed to rear and move pigs. To gain approval, farms must participate in the surveillance programme. Such legislation greatly aids private sector surveillance efforts.

Appendix VIII

'Producer pays' systems of research in Australia (5)

Australia has 'producer pays' systems of research for the poultry, dairy, pork, sheep and beef industries. Research is financed through levies on animal products. The collection of such levies is supported and enabled by government legislation, and the Government may augment this money with public funds. However, the funds are managed by the producer or industry organisations.

The Meat Research Corporation (MRC) illustrates some key features of 'producer pays' research, as follows:

a) A board, with representatives from the industry and from government and corporation management directs the activities of the MRC

b) A research and development investment strategy has been produced following a sector-wide evaluation of constraints and opportunities to the industry, and ex ante economic impact assessments

c) Research is commissioned through competitive tender procedures

d) Producers and processors organisations are used to communicate industry priorities to the MRC. The National Farmers Federation arranges cattle and sheep meat council meetings for farmers to discuss research needs. The Australian Meat Exporter Federal Council and the Meat and Allied Trades Federation of Australia represent processing and other interests.

e) Close links are ensured between research and potential end users by stipulating, firstly, that all research proposals are developed in consultation with the industry, and secondly, that 'private good' research is co-financed by the private sector, thereby ensuring private sector interest in the delivery of the research output.

References


