PUBLIC AND PRIVATE SECTOR ROLES IN THE SUPPLY OF VETERINARY SERVICES

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Introduction

Poor livestock health remains one of the main constraints to livestock development in many developing countries. While global data are not available, data from individual continents and countries lead to an estimate of several billion dollars in losses in animal products caused by diseases. For example, in Sub-Saharan Africa losses because of diseases are estimated at US$2 billion per year, of which half could be attributed to direct losses due to mortality, and the other half to indirect losses through reduced growth, fertility, and work output (FAO 1985). Similarly, in Latin America, five diseases alone (hog cholera, foot and mouth disease, brucellosis, tuberculosis, and rabies) are estimated to cause losses of US$900 million annually (FAO 1990).

But the losses caused by animal diseases are not restricted to lower outputs. Diseases prevent the introduction of livestock in certain areas (for example, in Africa loss of large tracks of high potential land because of African animal sleeping sickness and the skin disease *dermatophilosis*) and preclude the use of more productive animals such as crossbred dairy cattle and improved pigs and poultry breeds in others. Furthermore, certain livestock diseases are directly transmitted to man, and disease control thus not only acquires economic, but also social and political importance.

Disease control services, therefore, have been, and still are, an important input into livestock sector development. Fifteen percent of the Bank's livestock lending, or an average of about US$66 million per year, was destined over the last decade to veterinary health improvements (see figure 1). This share is particularly important in Sub-Saharan Africa, although much less in the other regions (table 1). Furthermore, in most developing countries, veterinary services consume about 60 to 80 percent of the budget allocated to livestock support efforts.

Historically, veterinary services have been the domain of the public sector and in many developing countries they remain so. This is partly a result of their original establishment as a detachment of the army to protect horses and other pack animals, and largely reinforced by the public-sector orientation in the 1960s and 1970s which viewed government as the main spur of development. Furthermore, past veterinary services were involved almost exclusively in the prevention of highly infectious diseases, which have strong public good characteristics or externalities associated with their utilization. However, more recently an increasing number of functions are carried out in cooperation with, or transferred to, private operators.

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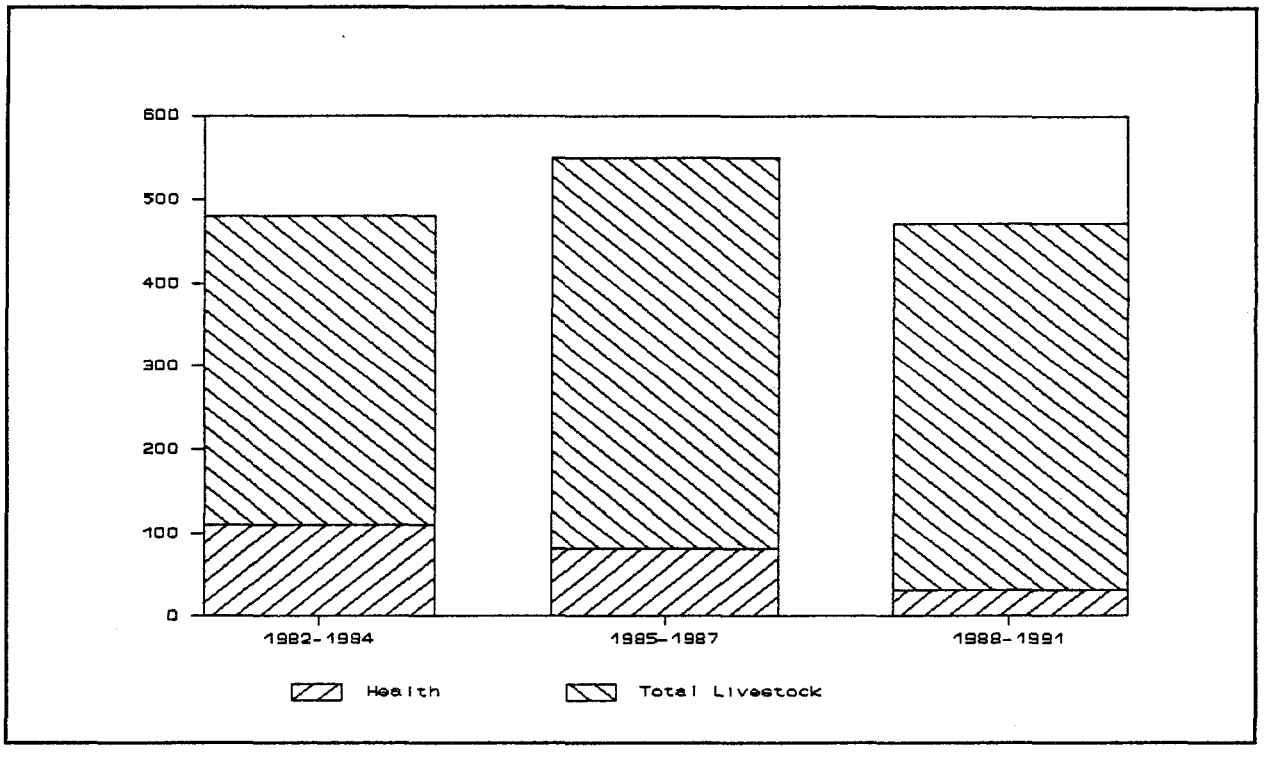
Figure 1. Livestock Health and Total Livestock Funding in Bank Projects, 1982-91



Source: World Bank data.

Table 1. Percentage Share of Livestock Health Expenditures over Total Livestock Funding in Bank Projects by Region, 1982-91

Region	*Percentage*
Africa	62
Asia	14
Latin America and the Caribbean	9
Europe, Middle East, and North America	8

Source: World Bank data.

This paper provides an overview of (a) the trends which spur increased privatization; (b) the economic concepts underlying the efficiency of delivery of veterinary services and that subsequently govern private and public sector roles; (c) the progress in privatization of veterinary services, including some examples of successful privatization; and (d) the future technology needs and policy requirements to facilitate privatization.

The Need for Privatization

Privatization of some veterinary services has received a strong impetus in the developing world over the last decade. Several factors contributed to this trend:

Fiscal constraints and poor management of resources have led to a decline in the operational efficiency of public sector services. The number of veterinary staff has grown faster than the means (such as vehicles and fuel, drugs and vaccines) to support them in many African and Asian countries, thus forcing the services to cut back on field activities. For example, while 33 percent of the budgets of the veterinary services of six Sahelian countries was allocated to operating expenditures in 1961-62, this share has declined to 25 percent by 1975 and to sixteen percent by 1988 (de Haan and Bekure 1991). Five countries in West Africa allocated less than 5 percent of their national livestock budget to the funding of nonsalary recurrent expenditures. While the situation in other regions may be less serious than in these Sahelian countries, the general tendency of relatively decreasing availability of recurrent funds is evident in most of the developing world.

The development of new technologies has shifted the focus from mostly herd-level prevention, which is more compatible with public intervention, to the treatment of individual animals, which is more suitable for private handling. Declining land areas for grazing due to population pressures have led to more intensive production. This, in turn, spurred the use of more capital intensive technologies, such as higher value hybrid animals, for which individual treatments are more easily economically justified. Moreover, the introduction of mass fabrication of veterinary pharmaceuticals has reduced their cost of production and subsequently their prices, making individual interventions more attractive economically.

Traditional livestock farming is shifting toward more commercialized operations. Cattle ownership is shifting from the traditional cattle-owning ethnic groups with considerable indigenous knowledge, to much less experienced commercial crop farmers in several regions of Africa and China. These commercial operations require a higher level of service. At the same time, there is an increasing awareness by traditional livestock herders of the benefits of modern veterinary medicine.

Increasing supply of veterinarians and shrinking public market. Due to fiscal contraints, governments have been forced to abandon their policy of employing all veterinary graduates. In addition, some regions (that is, the Anglophone developing world, particularly India and East Africa), have seen a proliferation of veterinary faculties resulting in an increasing supply of veterinarians. Private practice is further enhanced by the opening of opportunities to sell related products such as drugs, feeds, and farm tools. These factors contribute to the large numbers of veterinarians seeking to establish private practice.

Thus demand for veterinary services has increased strongly over the last decades, whereas public sector supply in many countries stagnated or deteriorated. At the same time a group of young graduates, all keen to establish themselves privately, has become available in many developing countries. Together these factors are generating a significant force for privatization.

Types of Veterinary Services

Veterinary services can be classified in four categories: (a) *curative services*, particularly the diagnosis and treatment to treat diseased animals; (b) *preventive services* to stop the emergence and spreading of diseases through vaccination, vector control and control measures, such as quarantine and forced slaughter of affected animals; (c) *production of veterinary pharmaceuticals*; and (d) *human health protection*, such as sanitary inspection of animal products.

Economic Principles

In assessing whether these services can be privatized, it is necessary to obtain a clear understanding of the nature of the service (Umali, Feder, and de Haan 1992). Veterinary services can be classified into four categories (table 2):

Private good. A good or service wherein the person who paid for the good or service exclusively benefits from it and no one else is able to avail of the good or service at the same time (for example, treatment of an animal's broken leg).

Private good with externalities. A private good or service whose production or consumption has spillover effects on other individuals, although the other individuals are not charged for the spillover benefits or compensated for the negative spillover effects (for example, vaccination provides spillover disease protection to animals owned by others).

Private good with moral hazard problems. A private good or service whose quality is not transparent or cannot be easily assessed (for example, vaccine quality cannot be easily evaluated).

Public good. A good or service wherein the consumption of the good or service by one individual does not reduce its availability to others and the person who paid for the service cannot exclude others from "free riding" or using the service as well (for example, food hygiene and inspection).

Following this classification, table 2 defines the appropriate sectoral distribution of responsibilities. Clinical care provided to animals is generally a private good.[1] Vaccination against contagious diseases involves externalities (protection of animals belonging to other farmers and export interests), which to some extent can be internalized through government interventions. These measures may take the form of mandatory regulations such as the issuance of vaccination certificates or the subsidization of vaccinations. However, in the absence of good enforcement measures for such ex-ante controls in many developing countries, the direct involvement of the government is required either through direct provision or subcontracting to private operators. Veterinary surveillance, which ensures that proper steps are taken to avoid the spread of a highly contagious disease to other farmers, is a public good.

In vector control, the economic nature of the control measure depends on the technology used. The classical methods of vector control involve externalities (dipping) and free-rider problems (aerial spraying). More recent technology using individual herd or animal treatments, such as special screens and traps, minimize the externalities involved in their utilization and enable individual farmers to capture the benefits almost exclusively. They are, therefore, more suitable for individual management and payment.

Table 2. Economic Classification of the Types of Livestock Services

Livestock service	*Type of Economic Good*		*Measures to Correct for*		*Sectoral Delivery*	
	Public	*Private*	*Externality*	*Moral Hazard*	*Public*	*Private*
Curative						
Diagnosis		X*				YY
Treatment		X**				YY
Preventive						
Vaccination		X*			Y	YY
Vaccine production		X				YY
Vector control						
Tick control		X*			Y	YY
Tsetse control	X	X*			Y	YY
Veterinary surveillance	X				YY	
Diagnostic support		X*			Y	YY
Quarantine			X		YY	
Drug quality control				X	YY	
Veterinary research	X	X			YY	YY
Human health protection						
Food hygiene/inspection				X	YY	
Provision of veterinary supplies						
Production		X				YY
Distribution		X				YY

Note: * private goods with externalities; ** private good with externalities only in the case of infectious diseases; YY economically justified; Y economically justified under special circumstances.

Source: Umali, Feder, and de Haan 1992.

The production of pharmaceuticals (vaccines and drugs) is a private good. Although the profits of new veterinary pharmaceuticals can be appropriated more easily, the market for veterinary medicines against specific tropical diseases in many developing countries is so small. This presents a major disincentive to research into socially desirable products by local private pharmaceutical companies. Unless international markets can be tapped (the strategy pursued by multinationals), some public sector assistance (and even from international public agencies) will be required to bridge this gap.

Economic Viability

Entry into the veterinary services market by a private practitioner will depend on whether a practice can be profitably sustained. If a favorable economic environment already exists, private profitability will depend primarily on the type of production system, the prevailing livestock density, and the extent to which economies of scale apply (Umali, Feder, and de Haan 1992). Economies of scale are highly relevant in veterinary services, because their provision involves a large proportion of fixed costs. The provision of clinical and preventive care requires veterinarians and veterinary auxiliary personnel to travel to the points of service delivery (for example, the farm, veterinary posts, or a designated stop). In such situations, the larger the number of units of service provided to clients at each point of service delivery, the lower will be the cost per unit. Specifically, the veterinarian's fee, transportation, and other transport-related costs can be spread over a larger number of animals and thus reduce the per unit cost of the service. The lower the costs, the more economically attractive they become to livestock farmers.

Because the provision of veterinary services entails significant indivisible fixed costs, veterinarians will not set up private practices unless the market for their services is large enough to sustain profitable operations. Thus, high density livestock areas will favor private sector participation, because these localities can generate a volume of demand sufficient to sustain private veterinary practice.[2] From the farmer's perspective, this cost differential can become a screening device as to who can afford veterinary services. Farmers with large herds are better able to take advantage of veterinary services than small farmers, because their cost per unit is smaller and thus makes the services more affordable. However, small farmers can overcome this handicap through membership in producer organizations and cooperatives that provide livestock health and support services. As a result of the pooling of veterinary service needs of smallholder farmers through these organizations, they are able to take advantage of economies of scale in the delivery of the services as well as provide farmers with a mechanism for internalizing the externalities associated with some services.

Using World Bank data on the cost of establishing a private veterinary practice in Cameroon (1986), Guinea (1986), Kenya (1988), and Uganda (1990), Umali, Feder, and de Haan (1992), estimated the financial breakeven number of veterinary livestock units for traditional, semi-intensive and intensive production systems.[3] The results are presented in table 3. They clearly demonstrate the importance of the type of production system and the importance of pharmaceutical sales on the financial viability of a private veterinary practice. To earn a minimum return of US$15,000 a year, assuming 240 trips a year and a 50 percent margin on drug sales, a veterinarian would have to treat an additional 7,600 to 13,400 veterinary livestock units (VLUs) in traditional systems and about 755 to 1,344 VLUs in the intensive systems.[4] If it is assumed that the veterinarian travels within a 15 kilometer radius or an area of 707 square kilometers, the breakeven livestock density in Guinea will be 15.3 VLUs per square kilometer, slightly more than the prevailing livestock density of 14 VLUs per square kilometer. In such cases, auxiliaries, with much lower remuneration expectations, become attractive alternatives.

Thus privatization cannot and should not be undertaken as a broad strategy; instead a selective policy should be pursued, taking into account the economic character of each of the veterinary services and the economic feasibility of private practice. As a first step, the transfer of private good services to the private sector should be promoted. Second services that involve externalities or moral hazard problems will require some form of public intervention. Subcontracting to private operators is one option. Third choices also have to be made regarding the type of veterinary practitioner to promote. In many livestock production systems, the establishment of professional practices is not viable financially and lower cost operators such as auxiliaries need to be promoted.

Table 3. Breakeven VLUs for Private Veterinary Practice in Cameroon, Guinea, Kenya, and Uganda by Production System

	Country			
Production system	*Cameroon (1986)*	*Guinea (1986)*	*Kenya (1988)*	*Uganda (1990)*
Traditional				
Pure vet service	6,775	3,997	11,281	5,352
Vet service + 25% margin	3,413	3,672	10,500	4,014
Vet service + 50% margin	51	3,347	9,720	2,677
Intermediate				
Pure vet service	1,129	666	1,880	892
Vet service + 25% margin	569	612	1,750	669
Vet service + 50% margin	NA	558	1,620	446
High intensity				
Pure vet service	0677	400	1,128	535
Vet service + 25% margin	341	367	1,050	401
Vet service + 50% margin	NA	335	972	268

Note: Fees are assumed to be--traditional = US$2, intermediate = US$12, and high intensity = US$20; 240 trips a year. NA--at 50 percent margin, drug sales exceed total costs of operations.

Experiences in Veterinary Privatization

In the developed world, veterinary services are mostly privately operated. Veterinary services in these countries share several common characteristics. The government role is generally reduced to the delivery of pure public goods. This includes control over epizootics and zoonoses and food control and hygiene. Growing priority is also given to the enforcement of animal welfare legislation by the public veterinary services. Externalities involved in the control of enzootic diseases are internalized through the creation of disease control funds, financed by compulsory memberships in insurance schemes and producer organizations and special product levies. The private input supply companies (pharmaceuticals and feed) are becoming increasingly involved in extension.

In the developing world, overall progress in privatizing veterinary services has been slow. A survey of livestock specialists from the World Bank and other government agencies carried out by Umali, Feder, and de Haan (1992) showed that in only a small number of developing countries are veterinary services provided by private practitioners (table 4). The progress in Africa is noteworthy.

Table 4. Sectoral Channel for the Delivery of the Clinical and Prophylactic Veterinary Services in the Developing World 1991

Region	Number of Countries in the Region			
	Mainly public	*Partly government partly private*	*Mainly private*	*Total*
Africa				
Clinical	12	14	5	31
Vaccinations	25	6	-	31
Latin America				
Clinical	1	2	2	5
Vaccinations	2	1	2	5
Southeast Asia				
Clinical	6	2	-	8
Vaccinations	8	-	-	8

Source: Umali, Feder, and de Haan 1992.

Examples of Successful Veterinary Privatization

The Central African Republic

The Central African Republic (CAR) offers an interesting example of a private, almost exclusively user-run, animal health care system. On the one hand, the very limited number of veterinary graduates and the low livestock density impeded the establishment of profitable private professional practices; on the other hand, the high prevailing disease challenge made access to veterinary inputs highly critical. In response to the increasing demand for animal health services, two successive Bank projects have built a basic animal health care system under the auspices of the national herders organization (FNEC) which supplies producers with inputs and provides training in the use of these inputs (for a more detailed discussion refer to de Haan and Bekure 1985; Umali, Feder, and de Haan 1992). Training is provided in cooperation with drug suppliers, who finance a large part of the production of adapted training materials. Compulsory vaccinations is the only activity retained by the government.

The following discussions illustrate some of the main experiences. After veterinary drug distribution was transferred to FNEC, the sale of veterinary pharmaceuticals grew strongly, thus refuting the allegations that farmers would not be willing to purchase drugs at full cost. Veterinary pharmaceutical sales through the formal sector jumped from US$12,000 a year in 1982 to approximately US$2.1 million in 1991 (de Haan and Bekure 1991).

As a result of the development of a reliable open market system, purchases of veterinary pharmaceuticals from the black market dropped. Successive household budget surveys showed that, while in 1982, 67 percent of the farmers bought their veterinary pharmaceuticals from the black market, this percentage dropped to 18 percent in 1985 and to only 7 percent in 1988 (de Haan and

Bekure 1991). This significant drop provides a strong counter argument against restrictive distribution policies. The exclusive right of government services and professional veterinarians to distribute and administer drugs is advocated frequently by the public sector because of concern that the distribution and administration of veterinary pharmaceuticals by laymen would lead to drug resistance and adverse consequences to human health. However, recent experience seems to show that such restrictive policies lead to a much more dangerous situation of "covert" and improper use, and poses a greater danger to public health. If the official distribution system cannot provide adequate supplies, and provided that farmers are given proper education and training in the use of veterinary drugs, they should be allowed access to these drugs.

Poor herders procured relatively more veterinary drugs than the wealthier ones. Household surveys in the CAR showed that poor farmers used on average 50 percent more veterinary drugs per head than wealthier ones (Umali, Feder, and de Haan 1992). The finding that a commercial open system is more equitable than a subsidized public system is confirmed by Leonard's (1985) findings in Kenya, where he showed that the transition to a more commercial system increased the number of visits the animal health agents carried out by a factor of ten, and those visits especially benefited poor farmers. In effect Leonard found that the agents graduated their charges according to their assessment of a farmer's ability to pay, and that the poorer farmers on average paid less for the same service than the wealthier ones.

However, the CAR operation is still not completely sustainable. Although in the beginning of the program the operations of FNEC were managed strictly on a commercial basis, their success has led donors and government to try to add social objectives to the organization. First for political reasons, the input distribution system was forced to expand sales to low-density livestock areas, while obliging it to maintain uniform prices throughout its distribution network. Second donors and the government added other social functions to the organization such as literacy campaigns and range management activities, which further burdened commercial operations. Third there is a continuing tendency of public interference in the day-to day FNEC management stemming from government's apprehension of fostering an independent power base at its side. Finally there is evidence of rent-seeking from government officials. Future strategies will, therefore, need to isolate this activity from donor and government interference.

Morocco

In Morocco the privatization of the animal health services was introduced as part of a structural adjustment program in 1985. The livestock densities in the high potential area of the country and the profitability of the intensive dairy and poultry farms permit the establishment of private professional practices. From only two private veterinarians in 1983, the number soared to seventy-six by the end of 1989 and to ninety-three by the end of 1991. Currently more than one-third of all Moroccan veterinary graduates operates in the private sector (World Bank data). They have concentrated in the high potential areas, covering about 42 percent of the country's cattle population and 30 percent of its sheep population.

Two key government policies brought about this success: (a) a policy of subcontracting some of the veterinary services to accredited private veterinarians, particularly the compulsory vaccination campaigns (these schemes account for about one-third to one-half of the private veterinarian's net income and provide essential job security to the incumbent private veterinarian); and (b) a strict government policy to curtail the provision of all curative services and the sale of veterinary inputs and noncompulsory vaccinations as soon as a private veterinarian is established in the area.

These policies have resulted in net savings for the government and improved livestock protection: (a) the average cost a head vaccinated by the public veterinary service was calculated at DH4.58 a head vaccinated, whereas the fees paid by government to private veterinarians amounted to DH3 a head; and (b) in 1989 the private veterinarians vaccinated 66 percent of the stock in their area on average, whereas the coverage of the public sector reached only 52 percent (World Bank data).

Policy Requirements for Privatization

These experiences lead to the identification of the following main policies required to bring about privatization.

Elimination of policies that promote unfair competition. Subsidized services and "moonlighting" by government veterinary agents are one of the most serious barriers to entry. The introduction of full cost recovery for private good services and supplies provided by the public sector is thus a key prerequisite for any privatization effort. Other barriers to entry, which should be eliminated, include veterinary drug import and distribution restrictions and price controls. Studies in the developed world (for example, Wise 1988), as well as indications from the developing world, show that the sale of pharmaceuticals accounts for between 30 and 50 percent of the income of a veterinary practice.

Institution of attractive subcontracting policies. Many of the public good services (meat inspection and diagnostic services) and private goods with externalities (compulsory vaccinations) can be very effectively subcontracted to private operators under government supervision.

Establishment of mutual insurance schemes and/or producer groups, to create the funding mechanisms for the control of diseases, which cannot be funded through direct payment. The creation of an autonomous fund would provide a more reliable source of financing for the payment of private subcontractors than the unreliable government budget and would, therefore, be an important feature of any privatization effort.

Establishment of the enabling legislation, adapted to the conditions of the country, which will protect and stimulate private animal health practice. This means that in those countries where the availability of private professional veterinarians and/or the nature of the economic environment constrains the establishment of private professional practices, legislative provisions should be established for auxiliary practices. Past legislation in the developing world has tended to copy the very restrictive European regulations, which reserved the right to administer most veterinary drugs to professional veterinarians.

Research and Technology Needs

Veterinary research tends to concentrate on disease control technology as such, with inadequate attention given to the capabilities of the system to deliver this technology. However, the delivery system most likely will remain poor in much of the developing world, and future control strategies and technologies, therefore, need to be tailored increasingly to fit deficient funding and poor infrastructure. This means that greater priority needs to be given to the definition of the cost-

effectiveness of the disease control measures and the development of diagnostic and control techniques, which are low cost and can be manipulated by nonprofessional staff under poor infrastructure conditions.

Cost-effective disease control measures can only be developed on the basis of a good understanding of the relative importance of different diseases. This information is notoriously absent in developing countries, and the use of cost-benefit analyses in decisionmaking concerning the launching of a disease control campaign or moving from control to eradication policies is very rare. Staff availability and political pressure seem to be more important criteria. A better definition of the relative importance of different diseases in any given environment and of the economic returns to eventual control or eradication campaigns deserves a high priority in publicly sponsored animal health research programs.

Low-cost and easily manipulable diagnostic tools and control technologies will also be important inputs into sustainable animal health care systems. The following exiting research is being carried out in this area, which could revolutionize animal health care systems.

Animal side diagnostic sets. Monoclonal antibody techniques will yield simple test sets to allow lay persons to diagnose disease types with a high degree of reliability (Winrock International forthcoming).

Genetically resistant animals. Clearly, genetically based disease resistance is the most sustainable form of disease control and there is increasing evidence that there is considerable genetic resistance to several diseases, such as African animal sleeping sickness and internal parasites. Further development of disease resistance will be assisted by the considerable ongoing research effort in identifying genetic markers, which will allow early identification and accelerated multiplication of the most resistant genotypes (ILRAD 1991).

User-friendly parasite control methods. Great promise is provided by the development of screens and traps to catch tsetse flies (the transmitter of African animal sleeping sickness) and by a new generation of pyrethroid-based insecticides with a long residual effect, which kills the flies before they can transmit the disease. These technologies are simple to apply and their benefits accrue almost exclusively to the owner and thus eliminate some of the free rider and spillover problems involved in the classical methods of aerial spraying against the tsetse fly and dipping of cattle for tick control respectively. The system of fly traps and screens, used by nomadic herders in the Central African Republic, has been demonstrated to reduce fly population to 5 to 10 percent of their original size (Cuissance 1989).

User-friendly vaccines. Considerable progress is being made in developing a thermostable vaccine against Rinderpest, instead of the present thermosensitive vaccine, which requires an expensive and difficult to manage cold chain. Similarly, the development of a thermostable vaccine against Newcastle disease in poultry, which can be mixed in the feed (Spradbrow and Latif 1991), removes one of the key constraints to village poultry production and is now being introduced on a national scale in Southeast Asia. More attention still needs to be directed to the development of multivalent vaccines, which again would significantly simplify their delivery and reduce costs.

Conclusion

A pragmatic approach to the organization of veterinary delivery services is required. First we need to have a clear understanding of the economic importance of the disease to decide on curative

and prophylactic strategies. Second the nature of the service required will, to a large degree, determine whether private delivery will result in a socially optimal level of supply. Active involvement of government in the supervision of disease control, with private operators carrying out the actual implementation, is in many cases an attractive alternative. Third the nature of the disease and the profitability of the livestock enterprise will determine whether private delivery is economically feasible. The economic feasibility of private supply will depend on several key factors including whether professional or nonprofessional staff will be used, and to what extent economies of scale can be achieved.The promotion of producer organizations is an option. Fourth modern technological developments will have a significant impact on these choices, because they will lower costs and simplify the application of disease control interventions, and thereby increase the opportunities for private operators.

Endnotes

1. The exception is the diagnosis and treatment of infectious diseases which involve spillover effects on other animals.

2. Private sector participation will be sustainable despite low livestock densities and high per unit costs if high-value animals (for example, dairy cows and purebred horses) are involved. The high value of the animals and thus the risk of serious economic losses provides sufficient incentives for the livestock farmer to insure that the animals receive the required veterinary services (Umali, Feder, and de Haan 1992).

3. The traditional production system is characterized by smallholder/pastoralist farming and low productivity (for example, less than 500 liters of milk a year and less than 12 percent offtake), while the intermediate production system is typified by more capital intensive operations and higher productivity (for example, from 500 to 2,500 liters of milk a year and 12 to 18 percent offtake). The high intensity production system includes feedlots, ranching, and intensive dairy production; it is very capital intensive with levels of production greater than 2,500 liters of milk a year and greater than 18 percent offtake.

4. A veterinary livestock unit is an animal unit introduced to aggregate the work requirements for animal health care of different livestock species; it is equivalent to 1 cow or 1 camel or 2 horses or 2 pigs or 2 donkeys or 10 small ruminants or 100 fowl (de Haan and Bekure 1991).

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