Systems approach to animal health services delivery in sub-Saharan Africa: concept development

J.E.D. MLANGWA * and D.N. KISAUZI **

Summary: The current trend towards restructuring to improve the standards and efficiency of public services in sub-Saharan Africa, within the framework of economic structural adjustment programmes, has stimulated debates and proposals regarding veterinary services in the region. Such debates sometimes neglect the fact that a number of different animal production systems may coexist within a single economy. The authors review the concept of veterinary services delivery systems and examine this concept in the context of animal production systems, concluding that different delivery systems may be required to cater for different production systems. Planners and policy makers are urged to ensure that advocated changes are compatible with the existing animal production systems. This systems approach may be applied in considering various aspects of veterinary services, including animal health care delivery, animal health education and training, research, outreach work and financing.


INTRODUCTION

Debates on the current status of veterinary services in sub-Saharan Africa have revealed a tendency for issues to be considered in isolation and, in some cases, a total failure to address the nature of the different animal production systems which tend to coexist within a single economy.

The present authors aim to encourage the use of a systems approach (3, 10) by discussing the concept of veterinary or animal health care services delivery system(s) in the context of animal production systems. Such an approach may be used to develop policy on various aspects of veterinary services delivery systems in sub-Saharan Africa.

According to Churchman (3), a system is a set of components which interact over time for a common purpose. In considering a system, one must examine the following features: the objectives of the entire system, the environment within which the system operates, any fixed constraints, the resources of the system, the various components of the system (their activities, goals and measures of performance) and the management of the system.

---

* School of Veterinary Medicine, University of Zambia, P.O Box 32379, Lusaka, Zambia.
** National Agricultural Research Organisation, P.O. Box 295, Entebbe, Uganda.
An informal systems approach is used: the goal is sought primarily through descriptive or intuitive means, rather than through the rigorous quantification used in formal systems analysis.

DELIVERY SYSTEM

An animal health services delivery system is an abstraction which is used to describe the way in which knowledge, skills and other resources related to animal health are organised within an economy for the delivery of services to animals and their keepers. Like any system, this is composed of a set of sub-systems linked together for a common purpose. In this case, the purpose is to optimise the use of resources (e.g. livestock, feed and housing) and improve the welfare of animals and humans by reducing disease. The sub-systems interact over time, and this interaction is a primary determinant of the behaviour of the system.

The various functional components of an animal health services delivery system are considered below.

Curative services

Curative services involve the provision of therapeutic or corrective treatment to individual animals or herds, and include clinics, ambulatory services and farm visits. This work is largely demand-driven, and personnel respond to direct requests from owners. The importance of a mobile field service comprising adequately-trained professionals, technicians and/or auxiliaries cannot be over-emphasised.

Preventive services

Preventive services are designed to cater for herd-based health requirements, applying the methods of epidemiology, preventive medicine and economics. Such services are essential for effective disease control, complementing and extending curative services, and may respond to changes – in disease control policy or in the epidemiological status of the population – by implementing control or preventive strategies.

Public health services

The domain of public health services includes the protection of human health through the control of zoonoses, food hygiene, environmental hygiene, inspection of food products of animal origin, residue testing and education of the public.

Promotional services

Livestock producers require information on managing, feeding and breeding animals to optimise productivity and prevent disease, and handling animal health problems through prevention, control and simple treatment. In some countries, such information is provided by specialist services. For example, in Zambia the Department of Agriculture handles livestock husbandry outreach work, while the Veterinary and Tsetse Control Department handles promotional aspects of animal health, in conjunction with the National Agricultural Information Services.

Regulatory organisations

Regulatory organisations (e.g. the Office of the Director of Veterinary Services) deal with the planning of policy, including the development of long-term strategies.
Specialised regulatory organisations exist in some countries (e.g. the Food and Drug Administration in the United States of America), determining which drugs are legally available in the market.

**Back-up or facilitating services**

*Training and research institutions:* develop human resources (through the education and training of animal health personnel), provide training to farmers, and conduct research to develop technologies which address animal health problems.

*Financing organisations:* include not only relevant government ministries but also banks and insurance companies. Private financing is well developed in the advanced countries of the North, where specific insurance policies may cover animal health disasters. The development of such services should be encouraged in developing countries, at least in the commercial sector.

*Diagnostic laboratories:* may be a component of curative or preventive services, research and training institutes, or independent organisations.

*Input delivery systems:* (e.g. pharmacies) supply drugs, chemicals, biologicals and equipment. For developing countries, inputs are usually imported, as domestic industries tend to be inadequate.

**SERVICE PROVISION**

Animal health services may be provided by private bodies, or by the State Veterinary Services. Private provision may be undertaken by various commercial operators:

- Self-employed agents may operate singly, or together with associates or employees.

- Corporate services may be established when it is more efficient (due to economies of scale or size) for private enterprises to provide in-house services and employ their own animal health personnel, sometimes also extending services to the public.

- Co-operative services and herder associations may be formed by consumers of animal health services, such as farmers or herders. Examples are the Mazabuka Farmers Veterinary Co-operative in the Southern Province of Zambia (which employs its own veterinarian) and the recently-established Livestock Services Co-operative Society in Zambia which, among other duties, will provide veterinary services to its members.

In addition, non-governmental organisations (NGOs) may establish services where government or other agents fail to reach farmers for various reasons. Examples are given by Grandin *et al.* (5).

The personnel providing these services may be professional veterinarians holding university degrees, technicians with two to four years training in animal health and graduating with certificates/diplomas, or animal health auxiliaries who are representatives of the producer, with short-term training in animal health and production.

It should be noted that one organisation may provide more than one service, for example a typical veterinary school will participate in providing curative, preventive, diagnostic, research and training services.
The actual structure of the animal health services delivery system in a given country will be a compromise between the ideal internal structure and the external contingencies facing the system. An important part of achieving this compromise is the type of enabling environment created by the national Government, in the form of policies and legislation, and by the economy.

A study of the delivery system is aimed at helping management to achieve a congruent fit between the environmental conditions, organisational tasks, staffing and the organisational structure adopted.

In operational terms, therefore, efficient and effective animal health services cannot be provided solely by developing technologies for the control of animal disease; it is also necessary to effectively organise the delivery of this technology (7). For example, effective vaccines are in existence for controlling rinderpest and certain other diseases, but Africa is just recovering from a continental epidemic of rinderpest which started in the early 1980s, despite the previous ‘successful’ Joint Programme, ‘JP15’.

**DELIVERY SYSTEMS**

Variations between different ecological niches and animal/livestock management patterns enable the division of animal production into a number of systems, the two main categories for animal health care being livestock production systems and companion animal systems. Most countries in sub-Saharan Africa have more than one livestock production system.

In livestock production and development, a ‘system’ is a group of management units with similar structure, production functions and methods of land use. Jahnke (6) distinguishes the following livestock production systems in the region:

- Range livestock production systems
- Pastoral systems in arid zones, characterised by high animal mobility
- Ranching systems, sedentary in nature, found in all or almost all ecological zones
- Crop livestock production systems in humid lowlands and cool highlands.
- Landless production systems, which are largely independent of the prevailing ecological conditions and are commercial in nature (e.g. pigs, poultry, feedlots, town dairies). In sub-Saharan Africa, such systems tend to be found in or near urban areas.

At the economic level, livestock production systems may be divided into two categories: commercial and traditional systems. The former exist for purely commercial objectives and normally employ modern management practices. Examples are large-scale specialist livestock farms and plantation livestock production. By contrast, in pure traditional systems, livestock production is for subsistence. In most economies, these traditional systems have been commercialised to varying extents. However, provided that the principal objective is non-commercial, these may be called traditional systems. The following systems have been listed as ‘traditional’ in Tanzania: pastoral; extensive agro-pastoral; intensive agro-pastoral; and specialised smallholder systems (the latter may be considered the first step towards medium-sized commercial systems) (1).

For the present purposes, companion animal systems will be divided into two types:

- elite systems, where animals (pets, guard or sports animals) receive much attention, including health care, from their owners who are willing and able to pay for
expensive interventions. Elite systems are predominant in developed countries while such systems are rare in sub-Saharan Africa, occurring mainly in or near urban areas or in relatively wealthy houses or farmsteads;

- non-elite systems, where animals receive minimal attention. In urban areas and near urban centres, veterinary treatment may be limited to vaccinations against rabies and dipping against ticks.

This division has a very important bearing on issues of animal health services delivery, such as privatisation.

Each production system is characterised by unique ecological and socio-economic factors which, in turn, result in particular patterns of management and disease behaviour (epidemiology). Socio-economic characteristics are important in determining the level of demand for inputs and the feasibility of alternative delivery systems.

Provost (10) argues that the environmental factors which determine the production system also influence host/parasite interaction resulting, for example, in locally-selected resistant populations. In turn, this will influence the behaviour and control of animal diseases. For example, disease control is easier in sedentary or commercial systems than in pastoral systems characterised by communal grazing and extensive movement of herds and owners (in search of grass, standing hay [uncut dry grass for grazing] and water) (4).

Consideration of production systems according to the degree of animal mobility and commercialisation gives rise to the following categories: mobile nomadic systems, sedentary traditional systems, ‘emergent’ systems, and fully commercial ‘crop livestock’ systems. Each of these categories will exhibit a different pattern of disease, animal density and location.

On similar grounds, Provost (10) advocates the use of a novel approach to the classification of livestock diseases in sub-Saharan Africa, through consideration of both the pathogens involved and the environment which determines the epidemiology and control methods. Provost takes a socio-ecological point of view discussing, *inter alia*, disease control methods according to livestock production systems (10).

Therefore, different health services delivery systems or sub-systems may be required in different production systems, giving rise to the concept of more than one animal health services delivery system within a single country (e.g. public and private delivery systems).

According to Schwabe (11), delivery of animal health services may function on one of two levels: the micro-level, focusing on the individual farm/herd; and the macro-level, focusing on larger populations. At the macro-level, government animal health services conduct programmes for the prevention, control and eradication of animal disease, or perform actions aimed at promoting animal health or public health. Schwabe also provides a model for the organisation of a Third World veterinary services delivery system (11).

**POSSIBLE APPLICATIONS**

A systems approach forces one to reflect on the meaning of ‘livestock development’.

As a socio-economic process, livestock development consists in improving the quality and increasing the value of the products and services provided by livestock,
notably by increasing productivity per head of livestock and enhancing animal welfare. This, in turn, leads to improved welfare for the producer and consumer, and for the nation as a whole.

As such, livestock development is appropriate when livestock production would raise resource productivity, thereby enhancing human welfare, more than any other activity (2). This has a bearing on the planning and management of animal health services delivery systems in remote and dry places, where traditional systems of livestock production predominate. Animal production is very important for the welfare of such communities and appropriate delivery systems should be developed to safeguard their livelihood.

Having elaborated the concept of animal health services delivery system(s) to some extent, the question remains: 'Of what relevance is this concept in guiding planners in developing appropriate delivery systems?' The authors believe that, in designing relevant delivery systems, due consideration must be paid to the type, mixture and sizes of different animal production systems within a country. For example, the structure and requirements of the livestock industries in developed countries are very different from those in sub-Saharan Africa, where traditional systems predominate (6). The systems approach will therefore be useful in examining issues such as privatisation, education and training, research, etc. and may be further extended into formal systems analyses to address these issues.

Schwabe (11) has used a systems approach in discussing animal health services delivery systems for the Third World. Pritchard (9) has urged educators to focus on the existing production system, as have several Expert Meetings of the Food and Agriculture Organisation of the United Nations on veterinary education in developing countries. However, some veterinarians still advocate copying the educational systems and curricula found in developed countries. As a result, most curricula in sub-Saharan Africa are still replicas or very near replicas of those of their respective sponsors.

In another paper in this issue of the *Review*, the authors present a theoretical and empirical examination of the question of privatisation of animal health services delivery systems in this region (8).

Although production systems are discussed as if they were static, in the real world one must deal with dynamic systems which may evolve from one type into another. For example, a system may change from a traditional system, through an 'emergent' system, into a fully commercial system. The delivery system must also evolve if it is to meet the changing demands of the evolving production system.

ACKNOWLEDGEMENT

This work was supported in part by a grant from the Norwegian Government to the University of Zambia.

* *

Résumé : L’évolution actuelle vers une restructuration visant à améliorer la qualité et l’efficacité des services publics en Afrique subsaharienne, dans le cadre des programmes d’ajustement structurel de l’économie, a suscité une réflexion et des propositions concernant les services vétérinaires de cette région. Or, ce débat néglige parfois le fait que des systèmes différents de production animale peuvent coexister au sein d’une seule et même économie. Les auteurs étudient les prestations de services vétérinaires et inscrivent ce concept dans le cadre des systèmes de production animale. Ils en concluent que divers systèmes de prestations peuvent s’avérer nécessaires en présence de systèmes de production différents. Planificateurs et décideurs devraient veiller à ce que les changements souhaités soient compatibles avec les modèles de production animale existants. Cette approche systémique peut s’appliquer aux différents aspects des services vétérinaires, et notamment aux programmes zoo-sanitaires, à l’enseignement et à la formation en matière de santé animale, à la recherche, aux travaux de vulgarisation, et au financement.


Resumen: La actual tendencia hacia una reestructuración de los servicios públicos en África subsahariana que permita mejorar su calidad y eficacia, en el marco de programas de ajuste estructural de la economía, ha dado lugar a una reflexión y a la elaboración de propuestas respecto de los servicios veterinarios de la región. Sin embargo, esta discusión deja a veces de lado el hecho de que diferentes sistemas de producción animal pueden coexistir dentro de una misma economía. Los autores estudian el concepto de prestaciones de servicios veterinarios y lo inscriben en el marco de los sistemas de producción animal, para terminar concluyendo que diversos sistemas de prestaciones pueden mostrarse necesarios en presencia de sistemas de producción diferentes. Tanto los responsables de la planificación como aquellos a quienes cabe tomar decisiones deberían velar por que los cambios deseados sean compatibles con los modelos de producción animal existentes. Este enfoque sistémico puede aplicarse a los diferentes aspectos de los servicios veterinarios, incluyendo los programas zoosanitarios, la enseñanza y formación en materia de sanidad animal, la investigación, los trabajos de divulgación y el financiamiento.

REFERENCES


