Economics and planning in the veterinary undergraduate programme: 
a model for sub-Saharan Africa

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

Summary: Veterinarians in sub-Saharan Africa work in resource-deficient environments. Decisions taken by veterinarians in this sub-region, on animal health, animal husbandry and public health issues, are therefore influenced by economic factors including macro-economic considerations related to the current structural adjustment programmes being implemented in the sub-region. In turn, decisions or advice given by veterinarians have socio-economic consequences on clients, on the effectiveness of the delivery systems for veterinary services and on the growth of national economies. For these reasons, economics and planning should be essential components of all modern veterinary undergraduate programmes in sub-Saharan Africa, in order to give veterinarians a basis for making decisions and giving advice which is both technically and economically sound. The authors argue that principles of livestock economics, livestock enterprise management, livestock investment analysis and economics of animal health care are necessary elements in economics and planning courses. They propose a division of these elements into discrete course units to allow for flexibility and adaptability to the different curriculum structures of schools in sub-Saharan Africa and, possibly, continuing professional development courses. The resource requirement for teaching the courses, the integration of the units in the undergraduate programme and the problems which are likely to be encountered in developing the courses are discussed.


INTRODUCTION: 
THE NEED FOR ECONOMICS AND PLANNING

Veterinarians in sub-Saharan Africa have two primary responsibilities: firstly, to provide animal health care and control zoonoses; and secondly, to engage directly in development projects and programmes on livestock production (12, 13, 14). The key approaches used are based on scientific and technical knowledge of preventive and corrective medicine, public health and animal production (12), supported by promotional skills (9). Traditional undergraduate veterinary education programmes in sub-Saharan Africa therefore include all these elements.

Livestock production in this sub-region is lagging behind demand and the gap is expected to widen if remedial measures are not taken (8). In practical terms, livestock

* School of Veterinary Medicine, University of Zambia, P.O. Box 32379, Lusaka, Zambia.
development translates into aggregate growth of the livestock sector and improved welfare of producers. In turn, this stimulates increased investment in both human and physical capital as well as in land for increasing production, but more importantly, it increases productivity and reduces waste.

The resources required to support the activities of veterinarians are scarce and there are other competing demands for these resources. Scarcity creates a problem of how to allocate the available resources to meet the specific objectives of the Veterinary Services, on the one hand, and general national economic objectives – usually growth, efficiency and equity – on the other. This is an economic problem, which is compounded by the fact that economies in sub-Saharan Africa are currently undermined by balance of payments deficits, soaring inflation, shortage of foreign exchange, budget deficits, regressing physical infrastructures essential for economic growth, a decline in the capacity of public and private services, and almost total dependence on external economic support. This has led to the evolution of structural adjustment programmes (SAP) which, for better or worse, will be the central motors of the economies in the sub-region in the future and will, in all likelihood, demand a more rational basis for resource allocation processes.

All of the above impinge with pervasive force on the work and effectiveness of veterinarians. Veterinary decisions taken on technical grounds have a socio-economic impact on clients, on the aggregate growth of the livestock sector and hence on the economy and on the disposition of funding agencies, ultimately stimulating either consumption or investment in resources. The cost of using a resource is gauged by the benefit which could arise from using the same resource in an alternative way – this is termed the “opportunity cost” of the resource. Common sense dictates that the benefits of each alternative decision or course of action should be weighed against the associated costs, given the objectives. The resulting net benefits are then compared in order to choose the optimal course of action. Weighing alternative outcomes or expenditures is greatly helped by a knowledge of economics and planning.

The values attached to the benefits and costs of veterinary and animal production services are eventually determined by the users of the services and of livestock products. At a higher level, the values are based on the society as a whole. Attaching appropriate values to costs and benefits therefore depends on whose behalf these are calculated, and economics and planning again provide the necessary guidelines. It is therefore of direct benefit to the users of veterinary services and indirectly to consumers of livestock products and the tax payer, that decision-makers or advisers use, among other elements, sound principles of economics when analysing issues related to animal health care, public health and livestock development.

It is becoming evident that agricultural economists are not easily available to provide guidance to veterinarians in solving economic and planning problems. The former are relatively few and are therefore often placed in central government units or large commercial enterprises. The training of agricultural economists tends to be biased towards crops and, even when such specialists are made available to veterinarians, the lack of a common technical language creates a communication barrier. Veterinary Services therefore have much to gain through ensuring that personnel are trained in economics and planning related specifically to animal health care, public health and livestock development issues.

Some veterinary schools have already recognised the need to train graduates in economics and planning, and have already introduced elements of these subjects into
veterinary programmes. An examination of some syllabi reveals a number of issues which need to be addressed at this stage in order to encourage harmonisation in the development of economics and planning as part of veterinary programmes. This paper puts forward proposals for the scope of essential course elements, models of how these elements can be structured into courses, the considerations to be taken into account when integrating the courses into the curriculum, and the resources which would be needed to run these courses.

THE SCOPE AND ELEMENTS OF THE PLANNING AND ECONOMICS COURSE

In defining the scope of the economics and planning course, due consideration must be given to the fact that veterinary education programmes are very crowded, with an average of more than the 800 hours per annum recommended by the Food and Agriculture Organisation of the United Nations expert panel on veterinary education in Africa (4). Introducing new courses requires either reducing the time for other courses or increasing the duration of the programmes, or both. None of these alternatives will be accepted without resistance, and the usual net result is that the time set aside for a new course is minimal. A review of the current programmes in a number of schools (Ahmadu Bello University, Nigeria; Makerere University, Uganda; Sokoine University, Tanzania; the University of Nairobi, Kenya; the University of Zimbabwe and the University of Zambia) shows a range of 0-90 hours for economics and planning courses with five of the schools devoting 30 hours or more to such courses, which is greater than the time allocated by a sample of European schools (7).

The second factor which should determine the scope of the course is the type of service system in which veterinarians work. Delivery systems for veterinary and livestock services can be categorised on the basis of the “output function” and the mode of delivery. The output function can be further divided into four main classes, namely: the commercial sector, the small-scale (emergent) sector, the traditional sector and the companion animal sector. The mode of delivery can also be differentiated into two categories: public Veterinary Services and private practices. Pritchard (13) summarises the current situation thus, “most veterinarians in Africa are employees of the government, very few operate private practices and emphasis is on livestock and not companion animals except where public health is involved”. Current trends indicate that private practice will be increasingly encouraged but it will be a long time before this becomes dominant. The emphasis on livestock is also likely to remain for the foreseeable future, as development of the companion animal sector will necessarily require a substantial rise in incomes. The status quo is thus likely to be maintained.

A 1985 study on the organisation of Veterinary Services in Africa (2) revealed that in some countries in sub-Saharan Africa, Animal Health and Animal Husbandry Services are integrated (Burkina Faso, Cameroon, Chad, Ethiopia, Mali, Niger, Somalia and Tanzania) but are separate functions in others (Botswana, Lesotho and Zimbabwe). The study advocates that a service which is competent in both spheres is the best guarantee for livestock development. If this is generally accepted, both areas have to be taken into account in designing economics and planning courses.

Economics is generally divided into macro-economics (which deals with aggregate concepts such as foreign exchange rates, inflation interest rates, national income, etc.)
and micro-economics (which deals with the behaviour of individual producers and consumers, and the functioning of the markets in which they interact). Given the limited time available in the veterinary education programme and the fact that the veterinary contribution to livestock development in sub-Saharan Africa starts primarily at the herd, flock or enterprise level – the micro-level – it is appropriate that emphasis is placed on micro-economic aspects related to livestock production and health. Animal disease and disease control programmes are economic processes which have permeating effects on animal production economics because they consume scarce resources (6, 10).

It may be argued that some macro-/micro-economic linkages – such as price policy – have to be appreciated by veterinarians, and that an understanding of the difference between financial and economic analysis is also desirable. These subjects must be mentioned in the undergraduate programme, but more detailed coverage should be left as an area of specialisation at the post-graduate level or as an area for short-term continuing professional development (CPD) courses for those whose responsibilities cover livestock development at district, national and regional levels. Similarly, as private veterinary practices are currently rare in sub-Saharan Africa (13) – although they may become more common due to the policy of encouraging privatisation and the development of urban centres and areas with commercial livestock enterprises – training in the management of such practices should be left for CPD courses or as optional courses to be taken in undergraduate programmes when the principles of livestock enterprise management have been covered.

In order to improve production and productivity at the micro-level and along commercial lines or even traditional lines, it is necessary to have an understanding of the basics of enterprise planning, management and investment analysis. Planning leads to implementation and this necessarily creates a need for monitoring in order to guide management. Hence project planning and monitoring are essential additional requirements to livestock economics.

In view of the above considerations, it can be recommended that the course in economics and planning for the undergraduate programmes should be designed in two main parts:


- Part 2, termed “Economics of Animal Health Care”, involves a single course unit covering disease and disease control as economic processes. Proposals for the aims, objectives, syllabus headings, pre-requisite courses and suitable textbooks for these courses are outlined below.

**PART 1: LIVESTOCK ECONOMICS AND PLANNING**

**Course Unit 1.1: Principles of Livestock Economics**

The aim of this part of the course is to introduce students to the language and principles of economics in the context of the livestock industry.

At the end of the course, students should be able to perform the following tasks:

a) Explain the connection between economics and veterinary medicine both in the curriculum and in practice.
b) Define and explain the concepts of production function, decreasing marginal returns, opportunity cost and substitution in livestock production and animal health (also Part 2).

c) Differentiate between technical and economic efficiency and the implications of these on the adoption of technological innovations.

d) Describe elementary supply and demand functions, the dynamic nature of these functions and how they interact to form prices in agricultural markets. Describe and explain livestock markets.

e) Explain the importance of the policy environment on levels of production and services.

The syllabus headings for this course unit are as follows: production theory, demand theory, prices and markets, policy issues in livestock development (including price policy), inputs, infrastructure, incentives, information and institutions.

For a suitable textbook, see (3).

Prerequisite courses for this unit are Animal Production, Animal Nutrition and Animal Breeding.

**Course Unit 1.2: Livestock Enterprise Management**

The aim of this part of the course is to impart to students an understanding of the theoretical basis for managing a livestock enterprise.

At the end of the course, a student should be able to perform the following tasks:

a) List and explain the importance of enterprise profitability factors.

b) Describe and explain information systems for the management and control of livestock enterprises.

c) Describe, differentiate, indicate the use of, make use of, and interpret different types of budgets and marginal analysis in livestock production and disease control (also Part 2).

The syllabus headings for this course unit are as follows: enterprise profitability factors, farm records, assessment of performance, budgeting and budgetary control.

For a suitable textbook, see (1).

Prerequisite courses for this unit are: Animal Production and Principles of Livestock Economics.

**Course Unit 1.3: Livestock Investment Analysis**

The aim of this part of the course is to give students the basic knowledge required for planning and monitoring livestock production projects.

At the end of the course, a student should be able to:

a) List, briefly describe and differentiate the stages of a planning cycle.

b) Explain, differentiate between and indicate the importance of the following:

   i) financial valuation and economic valuation

   ii) present value and future value

   iii) constant value and nominal value.
c) Discuss the "with and without project" concept, explain cash flow and application criteria, discuss uncertainty and how this is treated in livestock enterprise analysis and in animal health economics (also Part 2).

d) Discuss the scheduling of projects, monitoring and control.

The syllabus headings for this course unit are as follows: the planning cycle, valuation (mainly financial), time-value of money, decision criteria and uncertainty.

Prerequisite courses for this unit are: Animal Production and Principles of Livestock Economics.

For suitable textbooks, see (5, 14).

PART 2: ECONOMICS OF ANIMAL HEALTH CARE

The aim of this part of the course is to enable students to plan and manage animal health care projects and programmes.

The student who successfully completes Part 2 should be able to perform the following tasks (using general concepts in Part 1 where necessary):

a) Discuss the concept of a veterinary delivery system.

b) Discuss and explain the financing and costing of service delivery.

c) Differentiate between policy, programme, projects and activities.

d) Explain why disease and disease control are regarded as economic processes, explain their impact on supply and demand functions, and discuss the costs and benefits involved.

e) Differentiate between monitoring control and monitoring disease.

The syllabus headings for this course unit are as follows: veterinary delivery systems; components, service demand and supply of services; delivery cost, financing delivery and consumption; policy, programmes, projects and activities concepts; disease and disease control as economic processes; and planning and management of disease control projects.

For a suitable textbook, see (14).

Prerequisite courses for this unit are: Principles of Livestock Economics, Livestock Enterprise Management and Livestock Investment Analysis.

Veterinary Epidemiology is a prerequisite or co-requisite course, as an appreciation of disease control strategies is essential for Part 2.

COURSE MODEL AND ITS INTEGRATION INTO THE CURRICULUM

The above units can be modelled into a course which is adapted to the different livestock production systems of the country/region on which the veterinary education programme intends to focus, and which fits into the time available for the course. For
example, where the commercial sector is weak and pastoralism strong, Course Unit 1.2 may be reduced and Course Unit 1.3 and Part 2 strengthened accordingly. Where time is very limited, emphasis should be placed on Part 2, supplemented with selected essential elements from Part 1. The model can thus be used to develop courses ranging from 50-90 hours, with 60 hours being the desirable average. The final course chosen should enable graduating students to function at the entry level of the Veterinary Services of a country/region, while also providing a basis for further training in veterinary economics and planning.

The sequencing of the units should aim at saving time by minimising duplication. Economics for the veterinarian is, *mutatis mutandis*, based on the principles of agricultural economics and planning which embody livestock economics. It can therefore be advocated that livestock economics be covered first to expose students to both the language and principles of economics related to the livestock industry. The veterinary economics component – which is studied, at this level, in order to understand the effect of disease and disease control policy on the economics of livestock production – can be covered at a later stage. For example, a student with an understanding of the production function of a healthy production unit (animal, herd or national herd) – covered in Livestock Economics – can easily conceptualise, with minimum priming, the impact of disease on resource use efficiency, health care costs and benefits, and the ways in which adoption of veterinary and non-veterinary strategies (singly or in package form) can affect the productivity and profitability of livestock enterprises.

Several options exist for integrating economics into the curriculum: the subject may be taught as a single course (as is the case in Ahmadu Bello University and Ibadan University, Nigeria); it may be broken up into the two components ("Livestock Economics" and "Economics of Animal Health Care") and one or both components taught independently (as in the former programme of Sokoke University, Tanzania); alternatively, one or both parts may be taught with other courses (the University of Zambia previously tied Livestock Economics to Animal Production and Veterinary Economics to Epidemiology, while at Sokoke University, Veterinary Economics has been added to Veterinary Medicine in the new curriculum). The choice of approach is largely determined by the aims of the course and the resources available.

**RESOURCES AND STAFF TRAINING REQUIRED**

The above course model requires one lecturer with knowledge of both veterinary and livestock economics and planning, or two lecturers – one for each part. For the lecturer in veterinary economics, knowledge of epidemiology or epidemiological methodology is essential if the subject is to be covered adequately. Employing one lecturer with competence in both aspects would have the advantage of enabling a single person to integrate the whole course. For example, a discussion of production functions can include the effect of animal disease on production. Similarly, a discussion of investment analysis can cover basic concepts, investment in production *per se*, and animal health investment. On the other hand, if the course is taught by two people, repetition is bound to occur, especially when introducing basic concepts.

The factor which usually limits the development of such a course is the lack of a lecturer (or lecturers) committed to the subjects. There are very few agricultural economists within universities in sub-Saharan Africa who have an interest in livestock
economics, let alone veterinary economics, and equally there are virtually no 
veterinarians in these schools who have adequate training in veterinary economics, and 
even less in livestock economics. In the short term, the schools may have to depend on 
part-time lecturers from the specialist sections of the relevant government ministries, 
or visiting lecturers from other universities. However, the current funding environment 
for most universities in sub-Saharan Africa is such that they cannot afford the high 
fees for such specialists unless they are funded externally. In the long term, the problem 
of providing teaching staff for these courses will be solved by sensitising new graduates 
to these fields as areas for specialisation and ultimately entering them on graduate 
programmes to develop competence in both areas. Suitable and flexible MSc and PhD 
programmes are currently available in North America, the United Kingdom and within 
Africa itself.

Textbooks in English devoted entirely to economics for veterinarians, livestock 
economics or veterinary economics are difficult if not impossible to obtain. It is 
therefore the responsibility of the lecturer to develop appropriate courses mainly based 
on textbooks of agricultural economics and on primary or review journal articles. Case 
studies may also be developed locally or taken from secondary sources and adapted to 
suit local conditions. Some available texts or manuals in the fields of Veterinary 
Epidemiology or Veterinary Epidemiology and Economics contain a chapter (11, 15, 
16) or a number of chapters (14) on these subjects, but the coverage of economics in 
these works is inadequate, especially with regard to basic principles.

* * *

DES COURS D'ÉCONOMIE ET DE PLANIFICATION AU PROGRAMME DES 
ÉCOLES VÉTÉRINAIRES DES PREMIER ET DEUXIÈME CYCLES : UN MODÈLE 
POUR L'AFRIQUE SUBSAHARIENNE. - J.E.D. Mlangwa et D.N. Kisauzi.

Résumé : Les vétérinaires d'Afrique subsaharienne travaillent dans un 
environnement pauvre en ressources. Aussi les décisions qu'ils prennent sur des 
questions de santé animale, d'élevage et de santé publique sont-elles dictées par 
des facteurs économiques, notamment des considérations macro-économiques 
liées aux programmes d'ajustement structural actuellement mis en œuvre dans la 
sous-région. A leur tour, les décisions et recommandations de ces vétérinaires 
ont des répercussions socio-économiques sur leurs clients, sur l'efficacité des 
services vétérinaires et sur la croissance des économies nationales. C'est 
pourquoi des cours d'économie et de planification devraient faire partie 
intégrante de tous les programmes modernes d'enseignement vétérinaire des 
premier et deuxième cycles en Afrique subsaharienne. Les vétérinaires 
disposeraient ainsi des bases nécessaires pour prendre leurs décisions et émettre 
des recommandations judicieuses à la fois des points de vue technique et 
économique. Ces cours d'économie et de planification devraient entre autres 
porter, selon les auteurs, sur l'économie de l'élevage, la gestion des entreprises 
d'élevage, l'analyse des investissements et les aspects financiers des programmes 
sanitaires. Autant de disciplines qui seraient enseignées en modules séparés 
dans un souci de souplesse et d'adaptation aux différents programmes 
d'enseignement proposés par les écoles d'Afrique subsaharienne ; les auteurs 
préconisent également l'introduction de cours de formation continue dans ce 
domaine. Les ressources nécessaires à l'enseignement de ces matières,
l’intégration des différentes unités dans le programme de premier et de deuxième cycles et les problèmes susceptibles d’être rencontrés dans la mise en place des cours font l’objet de la discussion.


---

ECONOMÍA Y PLANIFICACIÓN EN EL PROGRAMA DE LICENCIATURA VETERINARIA: UN MODELO PARA ÁFRICA SUBSAHARIANA. – J.E.D. Mlangwa y D.N. Kisauzi.

Resumen: Los veterinarios de África subsahariana trabajan en un entorno pobre en recursos. De modo que sus decisiones y recomendaciones en materia de sanidad animal, de cuidado de animales y de salud pública dependen en gran medida de factores económicos y, en particular, de consideraciones macroeconómicas relacionadas con los programas de ajuste estructural actualmente en práctica en la región. Estas decisiones y recomendaciones de los veterinarios tienen a su vez una repercusión socioeconómica en sus clientes, así como en la efectividad de prestación de servicios veterinarios y en el desarrollo de las economías nacionales de cada país. Por esta razón, deberían dictarse cursos de economía y de planificación en todos los programas modernos de enseñanza veterinaria universitaria de pregrado en África subsahariana. Los futuros veterinarios contarían así con los elementos necesarios para poder tomar decisiones y aconsejar a sus interlocutores de manera adecuada, tanto desde el punto de vista técnico como desde el punto de vista económico. Estos cursos deberían incluir, según los autores, economía de la producción animal, administración de empresas ganaderas, análisis de las inversiones en el sector ganadero y economía de la sanidad animal. Todas estas disciplinas podrían dictarse en módulos separados para obtener la mayor flexibilidad posible y poderse adaptar a los distintos programas de enseñanza de las escuelas respectivas. Los autores proponen también la introducción de cursos del mismo tipo en el marco de un adiestramiento permanente. Analizan a continuación el monto de recursos necesarios para el dictado de estas materias, la integración de los módulos en los programas universitarios de pregrado y los problemas que puede plantear el desarrollo de estos cursos.


---

REFERENCES


