Dairy production

Introduction

Milk production is an important economic activity in Kenya and the country has been able to generally achieve self-sufficiency in its dairy requirements. Records show that annual domestic milk production more than doubled from 1 billion litres in 1980 to 2.4 billion litres in 1997 (FAO 2002). Since then, it is officially estimated that production has stagnated altogether despite the fact that the country is considered to have a potential to produce up to 4 billion litres/year (GOK 1997a), implying a gap of 1.6 billion litres between actual and potential output.

However, strong evidence is emerging that in the absence of a livestock census since 1969, these estimates may significantly understate actual milk production (Waithaka et al. 2002 (Western); Staal et al, 1998 (Central)) so that the gap may not be nearly as large as earlier thought to be. Nevertheless, the continued failure to realise more of the productive potential has been attributed to underfeeding of dairy cattle, poor breeding services, ineffective disease control services and lack of access to credit. In some areas, poor access to output markets contribute to low incentive to increase production, and so low demand for the above inputs. Low input use in those cases is not necessarily due to the unavailability of input services.

Underfeeding prevents cattle in smallholdings from realising a greater share of their genetic potential. Omore et al. (1999) attribute the low milk yields of between 5 and 8 kg/cow per day to under-nutrition. The main technical constraints to adequate cattle feeding include: poor quality and low quantity of available feeds and inadequate mineral supplementation. For breeding, the technical constraints relate to long calving intervals that sometimes stretch up to 600 days (Omore et al. 1999), although this is sometimes a deliberate farmer strategy to reduce risks and prolong cash flow (Tanner et al. 1998). Indeed, it is important to note that low cash input production strategies, including minimal concentrate feeding, may be very appropriate for small farmers with limited credit resources and great aversion to risk, or those with adequate land resources such as in parts of Rift Valley[2] (Kaguongo et al. 1997)

These constraints to the industry's ability to perform and produce milk exist against a background of increasing demand arising mainly from growing population and increased urbanisation.

Further, these constraints are considered to be partly associated with the inability of policies and responsible institutions to serve the interest of farmers. The main policy issues discussed under production are those related to industrial cattle feeds, animal health, artificial insemination, credit and dairy equipment.

Cattle feeds

Where intensive production systems are appropriate, as in many parts of the Kenya highlands, an important determinant of the growth of the livestock sector is the availability of high quality livestock feeds. Feed cost accounts for over 40% of dairy production costs in highly intensive dairy systems (Staal et al. 2003b).

The livestock feeds industry is regulated through the 'Fertilisers and Animal Foodstuffs Act Chapter 345, 1963' (revised 1977) and the 'Standards Act Chapter 496, 1977' (revised in 1981). Kenya is currently in the process of developing and formulating legislation and policies that deal explicitly with the livestock feeds sector. As part of the recently instituted countrywide economic reforms, the market for feeds has been liberalised and the feed prices decontrolled (GOK 1997b). The policy on cattle feeds is not yet finalised and a series of stakeholder consultative workshops have been planned to discuss the draft Animal Feeds Bill. The private sector has always handled the supply and distribution of livestock feeds. The co-operative societies have also been involved with supply of livestock feed and their involvement is more critical in those rural areas where manufacturers and their distributors may not be attracted.

However, concerns over the quality of cattle feeds have persisted. Farmers often attribute variable milk quantities and quality to variations

[2] In one of the most successful dairy industries in the world, that of New Zealand, low input production strategies are employed involving no use of concentrate feeding, resulting in very low costs of production. Their cattle do not achieve yields anywhere close to their genetic potential, yet this is not regarded as a constraint.

in feed quality. From the perspective of the dairy producer, quality of feed may be as important as cost. Variable and unreliable quality will increase risks and costs, and reduce farmers' willingness to use intensive production strategies. Variable quality may also affect smallholder farmers more severely than others. In such conditions, large producers who can invest in their own feed ration formulation may be able to gain a competitive edge over smallholders, who must rely on market supply of feeds of variable quality.

The quality problem is partially affected by low supply of the necessary ingredients, especially those that are not locally available, such as oilseed cakes and meals, meat and bone meal, fishmeal, finer mineral elements, vitamins and amino acids. Maize may at times be in shortage because of competition for human food. Many feed manufacturers are therefore faced with a shortage of raw material. Whilst this may partly explain the utilisation of only 30-65% of installed capacity, low demand for concentrate feeds from farmers, because of cost, low-input production strategies, and lack of output markets for milk, would also explain this under-utilisation of capacity. The capacity for oil seed production (60 thousand tonnes) is only about 30% utilised (MoALD 2000b). Imported feed ingredients are exposed to unpredictable foreign exchange rate changes that might impose additional costs on importers. However, the government has waived duty on such imports, except for a 3% tax on imports of pure forms of minerals and vitamins, subject to millers making a specific request to the Ministry of Finance.

However, it is not clear to what extent variable and low feed quality is simply the result of poor oversight and regulation, rather than problems in availability of ingredients. Poor enforcement of regulations allows opportunities for feed manufacturers to reduce quality standards in times of high ingredient cost or limited availability.

The manufactured feeds industry

The manufactured livestock feed industry has registered a very rapid growth over the past three decades. In 1970, for example, there were only 10 feed millers. Following price decontrol of feeds and liberalisation of feed distribution in 1989, a large number of feed processors entered the market. Currently, about 70 cattle feed millers produce various kinds of mainly concentrate feeds of high energy and protein density. Most of the feed millers are located in major urban centres, half of them being in Nairobi, suggesting that availability of infrastructure (electricity, water, railways etc.) as well as availability of raw materials from other processing firms such as oil seed cake millers or fish meal processors may be major determinants of location (Mbugua 1999). The distribution of millers by province is: 35 millers in Nairobi, 10 in Central, 1 in Eastern, 6 in Coast, 19 in Rift Valley, 1 in Nyanza and 1 in Western. All these have a combined installed capacity of 600 thousand tonnes per year against utilised capacity of about 390 thousand tonnes. Cattle feeds account for about 40% of this utilised capacity.

The leading feed millers are: Unga Feeds Ltd (with branches in Nakuru and Nairobi), Milling

Corporation of Kenya, Muus, Belfast Millers, Merchant Manufacturers, Kitale Industries, ABC, Ideal Manufacturers and Atta Ltd.

From the public interest point of view, the role of cattle feed manufacturers is mainly to make the feeds available to the farmers at affordable prices, at the right time and importantly, to ensure consistent quality in conformity with set standards. They are expected to be:

- efficient in their manufacturing, keeping pace with new technologies and world feed standards and
- able to translate their efficiency into competitive prices, and promote proper use of cattle feeds within the dairy industry.

The regulatory framework for cattle feeds market

The cattle feeds market is regulated by the MoLFD and the Kenya Bureau of Standards (KEBS) that is also responsible for setting the quality standards for all products sold in or imported into Kenya.[3] These standards are supposed to be reviewed every five years or as need may arise. However, standards of cattle feeds have not changed for a long time due to inadequate resources at KBS to conduct regular and comprehensive reviews. To enforce standards for cattle feeds, KEBS officials are mandated to conduct unannounced audit visits, and draw and take samples for analyses. Any serious breaches of the quality standards can be penalised as prescribed by the Kenya Standards Act (cap 496). However, enforcement of these standards by KEBS is weak due either to lack of incentives or capacity.[4]

Feed millers are registered as companies by the Registrar of Companies through the Companies Act Cap (486) and licensed by the respective Local Authorities. All together, 78 millers have been registered and licensed to operate in Kenya, six of which have recently closed down.

The government has only recently developed a policy for the feed sector and a proposed Animal Feeds Bill is currently undergoing stakeholder consultation (Chabeda 2001). Policies that currently affect cattle feeds such as decontrolled prices and liberalised marketing were implemented as part of the economy-wide Structural Adjustment Programmes.

[3]. See The Standards Act, Chapter 5, for details on Standards setting.
[4]. See The Standards Act, Chapter 5, for the capacity of KEBS to enforce Standards.

After farmers raised concern about the quality of various farm inputs, the MoALD responded in 1996 by appointing a team to act as inspectors for various farm inputs such as fertiliser and cattle feeds. The team whose task was to ensure that the inputs met the prescribed minimum quality standards included all District Livestock Production Officers (DLPOs) and other senior ministry officials. To date, the team has not been activated and some of the members have since left government service. This leaves the quality assurance function to be performed on behalf of government by KEBS, which is constrained, in the opinion of many stakeholders including farmers and feed manufacturers, by lack of capacity or will to regulate the feed sector. Veterinarians are gazetted feed inspectors, but are rarely active in this capacity. Lack of policy and a specific regulator, as well as lack of capacity to regulate, is believed to have created an environment that makes it possible for some manufacturers to occasionally supply substandard feeds.

Animal health services

Efficient and reliable animal health services constitute an essential ingredient to livestock development. Animal health services were for a long time been provided almost solely by the Department of Veterinary Services (DVS), which was established in 1903 to provide disease control and research services. After the country attained political independence, large European-owned farms were requisitioned, sub-divided and allocated to small-scale African farmers along with the grade cattle therein. The new government initiated animal health programmes to support smallholder farmers by offering them services at highly subsidised rates. The government filled the shortfall in service provision by hiring expatriate veterinarians and at the same time intensified local manpower training (ITDG 2000).

By early 1980s, budgetary pressures started imposing a constraint on provision of quality services by the DVS. The proportion of personnel emoluments increased steadily at the expense of operational expenditure. In fiscal year 1980/81, personnel emoluments comprised 52 and 66% of the recurrent budget of the Ministry of Livestock Development and Ministry of Agriculture, respectively, and by fiscal year 1988/89, the proportions were 77 and 79%. Personnel emoluments had absorbed potential operation and maintenance funds (Peterson 1991). By early 1980s, the quality of the animal health services had started to deteriorate as the rapid expansion of public sector veterinary staff, at the expense of funding for means of support and operating costs forced drastic cutbacks in field operations. Staff became office-bound and their morale plummeted as has been observed in many African countries (de Haan and Bekure 1991). Reforms were inevitable.

Following recommendations in the Sessional Paper No. 1 of 1986 (GOK 1986), the government started to move gradually from subsidised services to increased cost sharing and eventually full cost recovery and privatisation of some veterinary services. So far, clinical services, AI, management of dips, and production and distribution of drugs and vaccines have been privatised. Other services were left within the

public domain, including disease surveillance, veterinary quarantines, quality control of drugs and vaccines, food inspection, livestock and livestock product inspection, export and import control; disease control planning and control strategies, and national projects. A third category of services was to be shared between the public and the private sector, including contracting of vaccinations to the private sector under supervision of the government, vector control, research and extension, routing and checkpoint inspection in livestock marketing, and provision of laboratory services. In areas where private veterinary services have not developed, the government continues to offer services. Some farmers indicated that this is done on recovery basis. Duties on livestock drugs have also been waived to encourage usage.

Privatisation of clinical and breeding services

The leading participants in the privatisation of clinical veterinary services include the government, the Kenya Veterinary Association (KVA) and donors. With funding from the European Union (EU), the government and the KVA started the Kenya Veterinary Association Privatisation Scheme (KVAPS) to implement the privatisation of veterinary service in 1994. The overall objective of the KVAPS is 'to provide an improved delivery of animal health care services to the livestock farmers in Kenya', (KVAPS 2002), with the specific objectives being:

- improving the quality and availability of animal health services through the setting up of more private practices in rural high and medium potential areas of Kenya
- reducing unemployment of graduate veterinarians through the establishment of owner-managed veterinary practices and
- reducing budgetary pressure on the government in provision of veterinary services through the privatisation process, thus allowing the government to concentrate on surveillance and control of the major epidemic diseases and other core functions.

In line with these objectives KVAPS provides the following services:

- financial support
- training support
- monitoring and counselling support
- liaison with NGOs and industry
- collaboration with the DVS and Kenya Veterinary Board (KVB)
- a new role that KVAPS will get into in the year 2003 is advocacy with government and the wider public on issues of livestock concern that particularly affect the privatisation of veterinary services.

According to KVAPS, out of an estimated 1875 qualified veterinarians operating in Kenya in 2001, only about 200 are in private practice. The rest have taken up employment in the civil service or in private companies or in NGOs, are students or are deceased. The KVB, however, reports that of approximately 1400 registered veterinarians operating in Kenya, only 500 have retained their names in the register for veterinarians, and a slightly lower number of between 150 and 180 veterinarians are engaged in private practice.

TABLE 1. Distribution of veterinary practitioners in Kenya.

Field	Numbers	%
Government	560	30
University and research	145	8
Pharmaceuticals	300	16
Private practice	200	11
NGOs	15	1
Foreign students	200	11
Vets abroad	20	1
Deceased/others	435	23
Total	1875	101

Source: KVAPS (2002).

With the EU funds, a loan guarantee fund was set up in Barclays bank to assist with start-up capital for practising veterinarians who had joined the scheme. The scheme assists veterinarians with training in business management skills and processes loans to deserving applicants. The participating bank disburses the loans at a subsidised rate of 3% above the prevailing base lending rate, currently 15%.

Progress with privatisation of veterinary services

KVAPS has extended its services to 25 districts in Kenya. By 2002, only 59 veterinarians had participated in the scheme of which 33 were start-ups while 25 received expansion loans. The scheme has also supported private vets who are working in the ASAL areas in conjunction with NGOs (KVAPS 2002).

This rather slow progress can be attributed to the following factors:

- The state of the economy and its adverse effects on the farmers' ability to afford proper animal health care
- Legislative issues, such as the Pharmacy and Poisons Act, that prohibits qualified veterinarians from engaging in drug sales, thereby reducing the viability of veterinary practice (see Section 3.3.2)
- Competition from government veterinarians who use public resources (e.g. vehicles and drugs) for their own private practice, and hence undercut private practitioners
- Lack of training in business management skills for veterinarians
- The lengthy process to access the loans - the process takes an average of three months
- Applicants are required to provide acceptable collateral to the bank to cover at least 50% of the loan, a demand that many potential applicants find prohibitive.

In contrast, the number of agro-vets and dukas supplying animal health products has expanded rapidly over the years. While these private ventures are not constrained by some of the factors affecting professional suppliers of animal health services, this expansion suggests that a demand for animal health services does exist, and that the problem lies within the institution of private veterinary practice.

Regulatory framework for delivery of animal health services

Concern with the deterioration in efficiency of delivery of veterinary prompted the DVS to review the animal health policies and strategies

needed to enhance the contribution of the livestock sub-sector to the national economy. The resulting draft policy paper defines numerous policy and strategy directions that are considered important for dairy development.

When the draft policy becomes operational and is implemented, it will be expected to contribute to resolving a number of outstanding issues constraining livestock production and efficient delivery of veterinary services to the clients, including:

- the high cost of services and inputs
- low level of awareness of benefits of animal health care
- poor returns from livestock enterprises
- inadequate supplies of veterinary inputs
- inadequate storage facilities for drugs and vaccines in district veterinary offices
- cattle rustling in the ASALs
- resolving disease outbreaks from domestic and wildlife interactions
- breach of quarantine regulations
- large-scale outbreak of otherwise controllable diseases
- inadequate feeds and supplementation
- disappearing indigenous information base and ethno-veterinary practices and
- limited public awareness of the existing policies.

The proposed strategies cover services in the following areas:

- animal breeding
- animal disease and pest control
- veterinary laboratory and quality control
- animal welfare
- planning and management of veterinary projects
- veterinary training
- veterinary public health
- animal identification and
- regulation of veterinary services

The preconditions considered necessary for success in achieving the stated policies and strategies are:

- commitment and willingness by government to adopt and implement the proposed policies and strategies
- commitment by all stakeholders to provide the necessary support, by playing the roles specified in the proposal
- availability and access to markets for the anticipated increased livestock, livestock products and by-products and
- governments in the region will support border harmonisation and conflict-management meetings.

The time frame for the vision to be attained is 10 years. The policy paper is clear that regular monitoring and evaluation will be necessary to establish whether the policies and strategies require adjustment. The future of the livestock industry and by extension the welfare of targeted beneficiaries lies in careful implementation of the strategies proposed.

Currently, there are over 16 Acts of Parliament, which affect the veterinary profession. Two of these have a major impact on the profession,

namely, the Veterinary Surgeons Act (Cap 366) and the Pharmacy and Poisons Act (Cap 244).

Veterinary surgeons Act (Cap 366) and the Kenya Veterinary Board

The Kenya Veterinary Board (KVB), established in 1953 by the Veterinary Surgeons Act, registers veterinary surgeons. KVB has a membership of eight, composed of four elected by professional veterinarians, two nominated by the minister in charge of livestock development and two ex-officio members: the Director of Veterinary Services and the Dean of the University of Nairobi Faculty of Veterinary Medicine. The Minister nominates the chairman of the Board.

As the regulatory body, the main functions of the KVB are:

- arbitrates in disputes involving veterinarians
- takes disciplinary measures where necessary
- examines veterinarians holding qualifications obtained outside Kenya
- registers veterinarians and license them and
- supervises veterinarians in practice.

Registration and licensing of veterinarians

Upon qualification with a bachelor's degree from a recognised university, veterinarians are supposed to submit a formal application to the KVB for registration. In their application they are required to indicate the type of clinic they wish to operate, i.e. whether veterinary clinic, animal hospital, or ambulatory service. They are also required to indicate whether there are other veterinarians operating within the same locality.

The Board then conducts inspections of the premises and if satisfied that they conform to the requirements of the Act, the applicant gets registered, upon payment of a registration fee of Kenya shillings (Kshs) 500 (in 2002, US$ 1 ≈ Kshs 78.75). Subsequently, the veterinarian is required to pay an annual retainer fee of Kshs 500 in order to keep his/her name in the register. There is also an annual practice license fee of Kshs 5000.

The Veterinary Surgeons Act prohibits anyone to practice veterinary medicine unless he/she is registered and licensed by the Board. The minimum qualification for registration has been specified under section 4(1) (a) as a degree in veterinary science of a university approved by the Board or (b) a degree in veterinary science of any other university approved by the Board. Diploma and certificate holders in animal health do not qualify for registration or licensing and can only practice under the supervision of a registered and licensed veterinary surgeon.

The Pharmacy and Poisons Act states in section 19 (1) that 'No person other than a registered pharmacist shall, except as provided for in Sections 21 and 22 - (a) carry on either on his own behalf or on behalf of another, the business of a pharmacist; and (b) in the course of trade or business, prepare, mix, compound, or dispense a drug except under the immediate supervision of a registered pharmacist'. This effectively prohibits all veterinary surgeons from stocking large quantities of drugs unless a registered pharmacist is in direct control of the premises where the drugs are stocked and sold. This requirement can seriously curtail the profitability of any veterinary practice.

Effectiveness of the KVB in supervision of practising veterinarians

Given the extent of regulatory restrictions imposed on veterinary practice, the capacity of the regulatory bodies to enforce the restrictions effectively is of major importance. Regulatory bodies like the KVB should have adequate human and physical resources to enforce these laws. The entire staff of the KVB is comprised of an executive officer, administrative secretary and an office assistant/clerk. KVB has a head office, but no resources such as transport for field operations. With such limited staff and facilities, KVB has a very limited field presence and its ability to carry out its supervisory and regulatory functions is severely constrained.

Thus the lack of supervision of veterinarians has led to numerous cases of illegal practice in animal health. Firstly, it has created room for government veterinarians to engage unofficially in private practice using public resources.[5] Many public sector workers on payroll use public resources and time to supplement their income by carrying out private work thereby offering unfair competition to wholly private service providers (Lewis 2000). Secondly, veterinarians do actually stock veterinary drugs, contrary to the provisions of the Pharmacy and Poisons Act. Further, the majority of the shops selling livestock drugs are owned and/or are manned by individuals without any qualification in animal health (Table 2).

However, enforcement of the regulations is apparently very limited: when shop owners in Njoro were asked what they regarded as threats to the longevity of their business, none stated law enforcement officers as a threat, and did not seem to view enforcement of laws as a risk to their enterprise. This simply underlines the low levels of enforcement.

Table 3 illustrates further evidence that the laws have not been effective in prohibiting some categories of individuals from providing animal

TABLE 2. Classification and licensing of shops supplying veterinary pharmaceuticals.

Location	Agrovet (non vet)	Agrovet Vet	Agrovet AHA*	Pharmacist	Total	License displayed	Licensed (%)
Njoro Division	15	4	1	3	23	12	51
Bahati Division	26	2	7	1	36	18	50
Bungoma Municipality	7	0	0	8	15	12	80
Kimilili Division	9	0	1	2	12	9	75
Webuye Division	2	0	0	7	9	9	100

** AHA = Animal Health Assistant.*
Source: Lewis (2000).

5. It is not clear if the DVS condones this practice but the department certainly seems unable to prevent the use of public resources for private practice

TABLE 3. Effects of Veterinary Surgeons and Pharmacy and Poisons Acts on delivery of veterinary services in high potential areas and ASALS.

Legal issues	Effect on service delivery in high potential areas	Effect on service delivery in ASALS
Veterinary surgeons Act, Cap 366 • Only registered veterinary surgeons establish veterinary practices • Certificate and diploma holders in animal health not registered to establish veterinary practice • Community based animal health workers not recognised • The Pharmacy and Poisons Act Cap, 244 • Veterinarians cannot carry out business of veterinary drugs stockists • Veterinary personnel not in drugs inspectorate service	• Trained vets available to establish vet practices and offer services • Government vets available and providing services • Certificate and diploma holders trained and are carrying out illegal practices (providing services) • Certificate and diploma holders in government services are providing services • Number negligible • Insignificant effect on service delivery • Operation of private veterinary practices limited and therefore services delivery is equally affected • Sale of drugs monopolised by pharmacists who have little respect for ethical practices in dispensing these drugs • Inadequate control of drugs • Vet drugs in the hands of non-professional and hence poor services in many cases	• Number of vets trained is insignificant. No provision of services through private veterinary practices • Few government vets; thin service on the ground • A few certificate and diploma holders trained but working with NGOs • Few certificate and diploma holders in government sector-provision of limited services • Limited number available, but providing services illegally • Potential to train more exists if recognised by law • Supply and usage of veterinary drugs out of control • Many vet drugs in the hands of pastoralists resulting in poor and rudimentary services delivery

Source: Kajume (1999, cited in ITDG (2000).

health services, and summarises the legal framework governing veterinary practice, and its effects on delivery of veterinary services in both high potential areas where dairy production predominates, and in semi-arid and arid areas (ASALS). It shows that diploma and certificate holders are actively involved in veterinary practice. Again, in spite of the legislation, those selling veterinary drugs include non-veterinarians without any basic or relevant training, and potentially traders selling fake drugs.

The overall result is that there is much practice in animal health services that is illegal under existing law, but may be meeting much of the demand. There are many agro-vets, dukas and other shops stocking and selling livestock drugs, including those owned by individuals not trained in animal health, as described above. In a recent study, Kenya Agricultural Research Institute (KARI) scientists estimated that these outlets provide over 80% of animal health services to farmers. This implies potential abuse of drugs by laymen and unqualified practitioners, which may contribute to development of drug resistance and may have implications for drug residues in milk and meat. However, it must be acknowledged that in many places, farmers have few, if any, alternative sources of animal health services and information.

There may therefore be a need to revisit the two Acts in order to create a conducive environment to enable more effective provision of services in animal health, in a manner and at a cost that serves small farmers on which the dairy industry depends. Potential steps could include:

- reviewing the Pharmacy and Poisons Act to officially allow veterinarians to stock and sell drugs
- identifying mechanisms to encourage veterinary drug manufacturers to work together with other professionals in animal health to ensure that only competent personnel handle drugs. Many stakeholders consider that even diploma and certificate holders should be able to dispense some drugs under some form of supervision by qualified veterinarians. Such changes could result in getting more trained persons in to the drug dispensing business
- allowing para-veterinarians, including diploma or certificate holders or those trained for shorter duration, to practice legally. In connection with this, some 6000 Community Animal Health Workers have been trained in Kenya, as part of various projects. Whilst working predominantly in ASALs, they could possibly play a role in services to smallholder dairy producers. In addition, ethnoveterinary practitioners or 'local experts' as they are sometimes known, are widely used for primary animal health care. Their role is often underplayed, and should be considered, if they can provide relevant and quality services.

A proposed revision of livestock sector laws is currently being considered, following a review by DVS and KVB which looked at many of these issues (see Section 1.3).

Breeding services

The main policy issues in artificial insemination (AI) services relate to the proposed

harmonisation of breed improvement services and the development of self-sustaining breeding services.

Delivery of breeding services

Following the establishment of Kenya Stud-Book (KSB) in 1920s, other breeding and recording services have been introduced that play a role in dairy genetic improvement. These are the Central Artificial Insemination Station (CAIS), Dairy Recording Services of Kenya (DRSK) and the Livestock Recording Centre (LRC).

The KSB is mandated to carry out all official ancestry registrations and upgrading schemes of all animals. The CAIS was set up in 1946 to produce semen from breeding value proven bulls mainly to be distributed through the Kenya National Artificial Insemination Service (KNAIS). The DRSK, formerly known as Kenya Milk Records (KMR), is meant to promote dairy farm milk recording and performance evaluation. It carries out all official milk recording and butter fat testing, and makes the records available to CAIS for contract mating schemes through sires, which can be acquired nationally. The LRC was set up as a section of the Animal Production Department at MoLFD. Its objective was to promote farm recording of livestock, especially cattle, activities and performance evaluation; it mostly analyses data from the DRSK so that results can be used effectively in breeding programmes.

The Departments of Veterinary and Livestock Production have been in charge of these services in the past but farmers under the Agricultural Society of Kenya manage the DRSK and the KSB. They were financially constrained, not well co-ordinated and unable to deliver effective breeding services. A proposed solution was to group them together under one organisation charged with the responsibility of developing a self-sustaining breeding programme (GOK 1993; GOK 1994a) to be financed through cess collected from dairy farmers and income from services rendered. The proposed new organisation is the Kenya Livestock Breeders Organisation (KLBO). It is supposed to exist as a private and voluntary organisation that would ensure the supply of improved breeds to farmers on a commercial basis and would look into dairy productivity issues, including the role of new technologies like embryo transfer.

Implementation of harmonised breeding services

To implement the policy, a task force chaired by the Director, Department of Veterinary Services (DVS) was constituted in 1996. The task force has since completed its work and a report is ready but has not been released officially for implementation. This initiative to harmonise breeding services has therefore not been implemented. The slow pace of implementation could emanate from lack of clear guidance as to which arm of the Ministry should take the lead in this task. For example, although breeding is a production function, falling under the Department of Livestock Production, it is the DVS that convened the implementation task force.

Impacts of liberalisation of breeding services

The decline in publicly provided AI services through KNAIS left a gap in AI input services, which has been difficult to fill. The main complaint relates to the high cost of these

services. Though lack of adequate competition from AI input service providers may be a factor in this, the cost of importation of semen and embryos also seems to play a major role, despite the waiver of duty on the inputs. Importation requirements contributing to the high costs are: the bureaucracy and long waiting period required to acquire an import permit (average 3 months); charge per straw (Kshs 20); import declaration form (Kshs 5000); clearance charges by CAIS (Kshs 1000); fees (2.75% per invoice).

The resultant minimum landed cost of semen comes to about Kshs 100 (US$ 1.30) per straw (although this varies depending on the bull the semen is selected from), while additional costs raise the cost per service to a range of Kshs 600 to 4500 per service for top quality semen.[6] Additional costs that contribute to these figures include services rendered by CAIS in clearing and testing semen in its laboratories for diseases before it can be approved and released to the importer.

These costs are considered too high for the majority of smallholder farmers, and most prefer to use cheaper local semen provided by KNAIS, or bull service. While producers generally seem to consider that KNAIS offers poor services due to perceived but undocumented high failure rates, using bull service is a poorer choice given the potential risks associated with in-breeding and venereal diseases, as well as long-term degradation of the genetic potential of the herd. The result is that dairy cattle in many instances seem to be getting increasingly smaller (Kilungo and Mghenyi 2001) and with lower yields, although undernutrition may be an important factor contributing to this (see Section 2.1). On the other hand, some suggest that poor recording practices in AI among small farmers is also contributing to in-breeding in some cases.

Privatisation of artificial insemination services

Though an AI service was introduced in Kenya as early as 1935, followed by the establishment of CAIS in 1946, the use of AI among smallholders was only accelerated after independence. Though expensive to operate given the high funding subsidies from donors, the motorised AI delivery service by KNAIS was considered successful in improving dairy genetics of many smallholder dairy farmers. With the introduction of structural adjustment programmes, as recommended by the GOK and multilateral donors (GOK 1986), a process of gradual increases in user charges, moving steadily towards eventual privatisation was started. However, these services declined at a faster rate than the capacity of private service providers to fill the gap. The main policy thrust since then has been to encourage private veterinarians and inseminators to provide the service. In areas where the service is still relatively new, the government has tried to continue to provide the service but with emphasis on increased cost sharing and eventual withdrawal. In the long term, the government plans to retain only supervisory and advisory roles.

6. Dr N. Makoni of American Breeders Service (ABS), personal communication.

Private AI service providers

According to the DVS, there are about 300 private individuals, co-operative societies and veterinary clinics currently providing AI services in the country. Geographically, these are distributed as shown in Table 4. The Table indicates that the majority of private AI service providers also happen to be those areas with high dairy cattle density suggesting that market concentration is critical to the efficient provision of private AI services (Omore et al. 1999).

TABLE 4. Distribution of private AI practitioners by province.

Province	No.
Central	161
Eastern	35
Rift Valley	79
Western	9
Nyanza	5
Coast	7
Nairobi	6

Source: DVS (2001)

Implementation of private AI services

In 1991, the Government undertook a study with the objective of building self-sustaining AI systems and evaluated various options where beneficiaries were increasingly paying for their maintenance (GOK 1993). The proposed AI delivery options include promotion of:

- AI services in areas not currently served
- establishment of own-farm AI services for medium- and large-scale farms, and provision of the service to neighbouring farms
- contracting AI services where private inseminators are contracted by the government in some areas and
- co-operative AI services where dairy co-operatives run the service for members.

Indications are that the intended implementation of the policy change, to allow a seamless transfer of AI services into private hands, did not occur resulting in significant inadequacies in the provision of AI services. By mid-1993, only four co-operative societies and 14 private practitioners were operating their own schemes besides some 95 farmers who provided services to neighbouring farms. In 1997, there were 113 thousand inseminations by private inseminators. On the other hand, the number of inseminations by KNAIS registered a big drop from 542 thousand in 1979 to only 60 thousand in 1997. Indications are that the number of private inseminations has also declined since 1997 given the 2000 records of only 80 thousand inseminations provided by both public and private AI service providers. It should be noted however, that in post-liberalisation era, the role of co-operatives in AI service provision has increased tremendously. A number of stakeholders feel that with many unreported inseminations the numbers given above are inconclusive and largely under represent the reality.

Other reforms are being implemented through training of inseminators and supervision of practising inseminators. The MoLFD developed a training curriculum for institutions with the capacity to train inseminators. The curriculum provides the following requirements for training:

(i) Certificate holders (e.g. certificate from AHITI) or higher qualification holders take four weeks

(ii) 'O' level applicants without animal health training take eight weeks

(iii) Those with lower than 'O' level education, but who have worked with animals and have a demonstrable understanding of animal health (e.g. farmers) may qualify for an eight-week training.

In addition, institutions offering training are required to provide practical training using live cows. Consequently, inseminators trained in institutions that do not have farms may never be recognised and are unlikely to be issued with a Government certificate or license.

The curriculum has been made available to all institutions that can train inseminators. Organisations such as the American Breeders Service (ABS), that provide breeding services, have started training inseminators although their graduates do not qualify for government certificates and licenses on the grounds of perceived incapability to provide adequate practical training. However, a number of inseminators with training from such institutions seem to perform quite well in the field.

The government continues to train inseminators on a cost-recovery basis. Upon successful completion of the course, they qualify for a certificate on payment of a license fee of Kshs 1000 to the DVS. Once licensed, practising inseminators are supervised by the DVS through field veterinary officers. The supervision is however hampered by lack of adequate operational resources.

Dairy cattle breeders

The main pedigree breeds in Kenya are Friesian, Brown Swiss, Ayrshire, Guernsey and Jersey. Only Kilifi Plantations and Mukumu Farm breed the Brown Swiss and Guernsey , respectively. The rest are bred in a number of large farms. Going by the number of breeders, Holstein-Friesian is by far the most popular breed (22 registered breeders) followed by Jersey (9) and Ayrshire (8).

The dairy cattle breeders are responsible for ensuring that the industry gets quality dairy stock that will produce milk efficiently. They promote a variety of exotic and local species. Their role also includes promotion of the use of high quality breeding stock, lobbying for the interests of the industry and contributing to dairy sub-sector policy development. In practice, however, smallholders generally view the few breeders as an elite group not easily accessible to them.

Agricultural credit services

Through agricultural credit, farmers are able to acquire more goods and services than would otherwise be the case given their limited resources. The policy to improve flow of credit to farmers has included:

- increasing the minimum lending by commercial banks to agriculture from 17 to 20% of their deposit liabilities

- a proposal in the 1997-2001 National Development Plan to establish an Agricultural Development Bank (ADB) as a subsidiary of Agricultural Finance Corporation (AFC) to serve as an additional vehicle to finance agriculture activities (GOK 1997c).

These goals were never realised. Commercial banks have generally not met the suggested minimum lending to agricultural investments, the ADB did not get off the ground, and the AFC itself collapsed due to apparent poor management and political interference. Other constraints to increasing access to credit included requirements for collateral that many borrowers do not have, high interest rates and grace periods that do not correspond to the gestation period in dairy enterprise investments.

It is also important to note that over the period since 1997, the government has increasingly adopted policies or issued statements that discourage direct involvement in commercial institutions, and a move to establish or expand parastatal agricultural banks will be seen as a step backwards. Re-establishing AFC or reviving the idea of the ADB as originally conceived would therefore appear to be contrary to other policies of the government. Currently, small-scale farmers who access credit mainly do so through small- and medium-scale enterprises lending institutions, co-operatives or self help groups. The increasing role of micro-credit lending institutions and demand for their services deserves further discussion.

Small-scale lending institutions

Institutions willing to lend to small-scale enterprises at favourable terms have emerged and are expanding their activities. Their favourable lending terms include willingness to lend small amounts, low interest rates and the non-requirement for collateral. One of the most successful in this category of lenders is the K-Rep Bank. The Bank provides various types of loans to individual and group customers. For example, it has different terms for different categories of borrowers such as retail and group based customers. K-Rep headquarters is located in Kawangware, a high-density population area where incomes are relatively low. The Bank also has 5 upcountry branches and 21 sub-branches and plans are underway to expand and open up two further branches in Nairobi.

Other banks providing similar services include Faulu Kenya, Kenya Women Finance Trust, and NGOs such as Care Kenya and Plan International. Most stakeholders consider that further institutional innovation in micro-finance provision is still required.

Other common sources of savings and loans are 'Merry-Go-Round' groups, Rotating Savings and Credit Organizations (ROSCAS) that provide savings and credit facilities through rotational systems where the members contribute periodically a certain amount, which is given to each member in a cyclical pattern.

Co-operatives have also continued to play a critical role in micro finance within the dairy industry. Dairy co-operatives are increasingly linking their marketing activities to provision of input services although this form of input credit mainly occurs in Central Province especially Kiambu (Omore et al. 1999)

Summary of main issues in milk production

Cattle feeds

The main issues and constraints relating to the supply of cattle feed are:

- costs that are perceived to be too high by farmers
- shortage of key of feeds and key ingredients
- variable and/or low quality of cattle feeds and ingredients used in feed formulation
- uneven distribution of feed millers
- lack of a clear policy guideline and effective regulation to ensure the supply of standardised quality feeds
- decline in production of drought resistant crops and unavailability of fodder and pasture seed material including legumes
- inadequate services such as extension, research, and market information
- inadequate appropriate technological know-how in forage management and storage.

These constraints have clearly adversely affected the markets for cattle feeds, going by the low demand and under-utilised processing capacity.

Animal breeding services

The main issues and constraints emerging in provision of breeding services are:

- he as-yet unimplemented policy to harmonise breeding activities
- non-recognition by the government of inseminators trained by the private sector, despite their increasing role in AI service provision
- perceived high failure rates in AI services provided by KNAIS
- high costs of private AI services
- decline in AI service use and increasing reliance on unproven bull service by many smallholder farmers and
- ineffective supervision of AI service providers by the DVS.

Animal health services

The main issues relating to animal health services include:

- weak supervision under the Pharmacy and Poisons Act is the restrictions under the Act that prohibit veterinarians from stocking veterinary drugs
- exclusion of veterinarians as drugs inspectors under this Act has also limited the capacity to control the use of veterinary drugs thereby potentially contributing to their misuse
- prohibition of certificate and diploma holders from private practice by the Veterinary Surgeons Act. This prohibition is considered by some stakeholders to unnecessarily deny the para-veterinarians opportunity to contribute to private veterinary service provision and to fill the gap in demand for such services in many areas
- weak supervision by KVB of practising veterinarians owing to inadequate capacity and resources.

It is however noted that these contentious issues under the two Acts have been included under the Livestock Sector Policy and Legislation Review by the DVS and the KVB as described in Section 1.3.3.

Some stakeholders consider competition to private veterinary practitioners from vets on public payroll unfair. Whereas this has a disincentive effect on private veterinarians, experience from some countries indicates that there may be some benefits, as well in filling the service gap. In relation to this, some private veterinary practitioners have demanded the removal of public vets whose work can be contracted out to them, as is the practice in many parts of the world. Further analysis is needed to provide some insight and guidelines on public vs. private roles in animal health service delivery in dairy-producing areas.

Access to credit input

The main issues in access to credit are:

- non-implementation of intended government interventions to make credit easily available
- slow growth of private micro-finance institutions
- prohibitive collateral requirements
- lengthy loan application procedures and
- inappropriate forms of credit and high interest rates.