

REPORT OF THE DIRECTOR OF AUDIT

LIVESTOCK PRODUCTION AND DEVELOPMENT

CATTLE AND GOAT SECTORS

Ministry of Agro Industry and Food Security

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ABBREVIATIONS AND ACRONYMS

APD	Animal Production Division
AREU	Agricultural Research and Extension Unit
CS	Cooperative Society
DBM	Development Bank of Mauritius
DVS	Division of Veterinary Services
FSF	Food Security Fund
FSFC	Food Security Fund Committee
FSFPIU	Food Security Fund Project Implementation Unit
FSFSP	Food Security Fund Strategic Plan 2008-2011
LPU	Livestock Production Unit
NAO	National Audit Office
SM	Statistics Mauritius

EXECUTIVE SUMMARY

The global food crisis is characterised by both food shortages and price rises. The Food and Agriculture Organisation (FAO) has attributed the food crisis to rising demand for agricultural products leaving many food items out of the reach of low income earners. Experts predict that the shortages will persist for a long time to come, and will get worse. Food security is therefore essential to the very survival of people. For Mauritius food price volatility and food security is always a concern. Systemic causes for the worldwide increases in food prices as well as the need to ensure food security continue to be the subject of debate. In response to the severity of the food crisis and the need for prompt action, the National Audit Office (NAO) felt the need to undertake a performance audit at the Ministry of Agro-industry and Food Security (the Ministry) to determine whether its services are efficient and effective for livestock production and development to ensure food security.

This report examines the services of the Ministry in the cattle and goat sectors and outlines the extent to which projects and financial schemes under the Food Security Fund (FSF) are being implemented and run in an efficient and effective manner. It also covers goat farming practices.

Key findings

- The financing, implementation and monitoring of the project for the setting up of three model dairy farms and one goat multiplier farm were not satisfactory. The construction of the farms lagged behind their scheduled completion dates.

- The Ministry, through FSF, launched several schemes for the livestock sector, in December 2009. The schemes offered financial assistance to construct/renovate farm houses, purchase equipment, import improved genetic breeds of animals and cultivate fodder. However, the efforts made by the ministry did not achieve the expected results mainly for the following reasons:
 - The individualistic mentality which prevails among the farming community farmers did not allow them to group together to receive financial assistance.
 - The difficulties experienced by the ministry in importing livestock animals. Several expressions of interest were launched to invite both local and international firms to import/supply animals. The outcomes were not positive.
 - The possibility to source animals on the local market was considered, but was not successful as the cost per animal was higher than the amount of grant and loan offered for one animal, and also the unsatisfactory performances of the animals such as low milk production, high death rate and poor body conditions.

- The ministry attempted to facilitate the production of young breeding animals through the concept of multiplier farms but was unsuccessful.

- The local production of goat meat was insufficient to meet the increasing demand. The current goat farming practices favour inbreeding and premature mating. These have negative impacts and contribute to the low performance of the local herd compared to imported goats. However, the ministry had so far not been successful in addressing the problem.

Conclusion

The ministry has been taking various measures to enhance the production and development of the cattle and goat sectors through developing projects, putting in place various schemes and attempting to sensitise good farming practices. These measures have so far not brought the expected results. The construction of model farms was not well managed and the ministry experienced difficulties in implementing the various schemes.

Recommendations

- The Ministry invested significant amounts of money on the construction of farms. Therefore it should ensure that value for (taxpayer's) money is obtained. This can be achieved by addressing the shortcomings using good project management practices in the implementation and monitoring of projects. This can also be applied to all future works so that the objectives set for the projects may be attained.
- The ministry should encourage breeders to take a more active part in developing the kind of association and activities that promote livestock production – turning existing cooperatives into successful ones and establishing new more efficient and effective associations. One of the areas where much effort should be put is in sensitising, educating and training so as to encourage farmers to cooperate with other fellow farmers to aim for higher productivity and achieve greater economies of scale.
- The Ministry should explore other possibilities for applicants/farmers to group themselves, say, in an association with the only purpose of importing their animals. APD and DVS can advise on selection criteria.
- Efforts should be concentrated on combating inbreeding by educating and sensitising farmers on the negative impacts of inbreeding and premature mating. The ministry should provide continued education and training to goat farmers on good farming practices.

CHAPTER ONE

INTRODUCTION

1.1 Audit Motivation

The issue of food security across the world became prominent in 2008 when, according to the FAO, international food prices had increased to their highest level in 30 years. In Mauritius, government woke up to the call that efforts needed to be ramped up at all levels to strengthen its ability to withstand future shocks – market volatility, natural disasters, financial crises – and to boost agricultural productivity so that it contributes to long-term food and nutrition security.

For Mauritius, having a high level of trade dependency for its food supplies, food price volatility is always a concern. Our net food requirement is estimated at 690,000 tonnes annually, up to 75 percent of which is made up of agricultural and food products imports. While the country is self-sufficient in poultry, eggs, pork and most vegetables, it is heavily dependent on foreign sources for its supply of food grains and other products of animal origin. Overall local production in the livestock sector accounts for around two percent of our total requirements in milk, and for less than 1.5 percent in meat, excluding poultry and pork. Over a short span of six years, our food import bill almost doubled, from Rs 18.9 billion, in 2006 to Rs 34.5 billion, in 2012. The overall prices of milk and meat products remain high; this trend is expected to be maintained.

The overall policy of government, for the livestock sector, has always been to improve self sufficiency in milk and meat. Government has taken various incentives to boost up local production of milk and meat. In spite of these efforts, the country continues to be heavily dependent on imports.

It is against this background that National Audit Office (NAO) decided to carry out a performance audit at the Ministry of Agro-industry and Food Security (the Ministry) to assess the effectiveness of the incentives and other measures taken to enhance production and development of livestock to ensure food security.

1.2 Audit Objective

This audit seeks to establish whether the measures taken by the Ministry through the Food Security Fund, have effectively contributed in enhancing the production and development of livestock, in the dairy cattle and goat sectors, to ensure food security.

1.3 Audit Scope

The NAO examined how far the Ministry is promoting livestock production and development in the cattle and goat sectors through its service divisions, agencies and the Food Security Fund. The audit covered the period 2009 to 2013. However, data for a longer period were used to identify trends. Also in some analysis the latest official data available (2012) from Statistic Mauritius were used.

1.4 Audit Design

NAO focused on whether the Ministry is doing enough to enhance the production of local milk and meat from cattle and goats. The following two audit questions were developed and their answers helped to meet the audit objective. The audit questions were as follows:

- whether livestock projects financed by the Food Security Fund(FSF) have been carried out, and FSF financial schemes are being run, in an efficient and effective manner;
- whether the Ministry is doing enough to improve the genetics of the local goat herd.

1.5 Audit Methodology

The audit was conducted in accordance with International Organizations of Supreme Audit Institutions standards. Different methodologies were used to understand the audit area along with obtaining sufficient, relevant and reliable audit evidence that support the conclusions and recommendations. The following methodologies were used in this performance audit:

- Conducted semi-structured interviews with senior management and staff members of the Ministry and statutory bodies concerned with the livestock sector. The team also interviewed the Project Coordinator of the FSF.
- Examined documents, files, minutes of meetings, contracts and reports available at the Ministry and relevant statutory bodies.
- Carried out extensive literature review to understand practices in livestock production and development and their application in other countries.
- Carried out statistical and financial analyses.
- Visited selected farms.

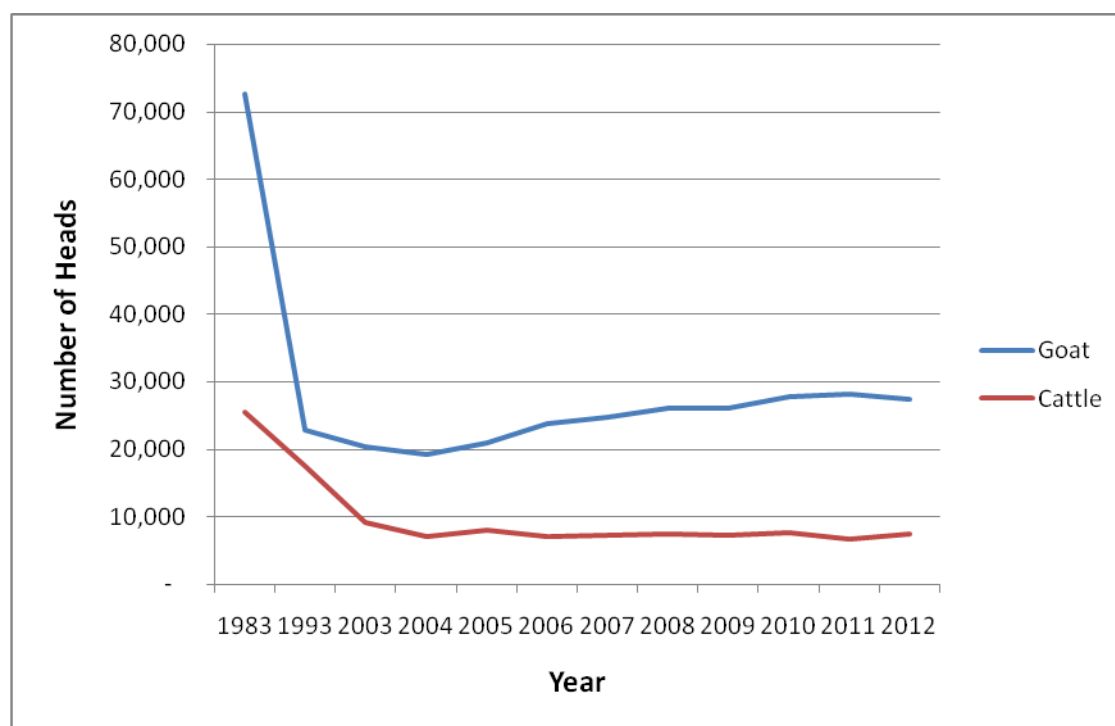
CHAPTER TWO

OVERVIEW OF SECTORS

2.1 Trends in livestock production

Over the last decades, the increase in local livestock production has not been sufficient enough to meet the local demand for milk and meat. Mauritius still has to resort to a large extent on imports to meet demand for same. The challenges in producing meat and milk locally are limited number of commercial farms, low input system of production, poor husbandry practices, limited land for livestock development and fodder plantation.* The industry has also been affected by trade liberalisation policies, cheaper imports leading to serious decline in local production.

Figure 1 shows the steady decrease in our cattle population. In contrast, there seems to be an increasing awareness and interest in goat farming in Mauritius. The goat population decreased dramatically from 72,696 heads in 1983 to 20,330 heads in 2003, representing a fall of 72 percent. However, a slight increase in the trend has been noted in the population after 2003.



Source: Statistic Mauritius

Figure 1 – Trend in cattle and goat population (1983 – 2012)

*Source: para 10.5 of the Blueprint for a sustainable Diversified Agri Food Strategy for Mauritius 2008-2015

2.1.1 Policy and supporting measures

The policy of the Ministry has always been to improve self sufficiency in milk and meat.¹ To restrain the sharp decline in the number of livestock heads from the (census year) 1983 figures, Government has always provided support; farmers have benefitted and continue to avail themselves of certain incentives. Some of the most important ones are mentioned below:

- *Free veterinary assistance.* Farmers are provided with free 24 hour veterinary assistance by the Division of Veterinary Services (DVS).
- *Artificial insemination (AI).* The DVS provides an artificial insemination service to cow breeders against a nominal fee per insemination.
- *Extension services.* Free advisory services and technical back up are offered by Agricultural, Research and Extension Unit (AREU).
- *Subsidy on animal feed.* Breeders benefit from a subsidy on animal feed to the tune of Rs 2,000 per tonne since October 2009.
- *Food Security Fund (FSF).* Financing schemes were introduced at the end of 2009 to enable farmers who form part of cooperatives, associations and companies to establish intensive system of production and apply modern technology.

2.2 Dairy Cattle Sector

According to AREU, farmers in this sector are classified into two categories: small and large. Small farmers are those owning up to 20 heads of cattle and all others are considered as large ones.

2.2.1 Small holder dairy sector (up to 20 heads)

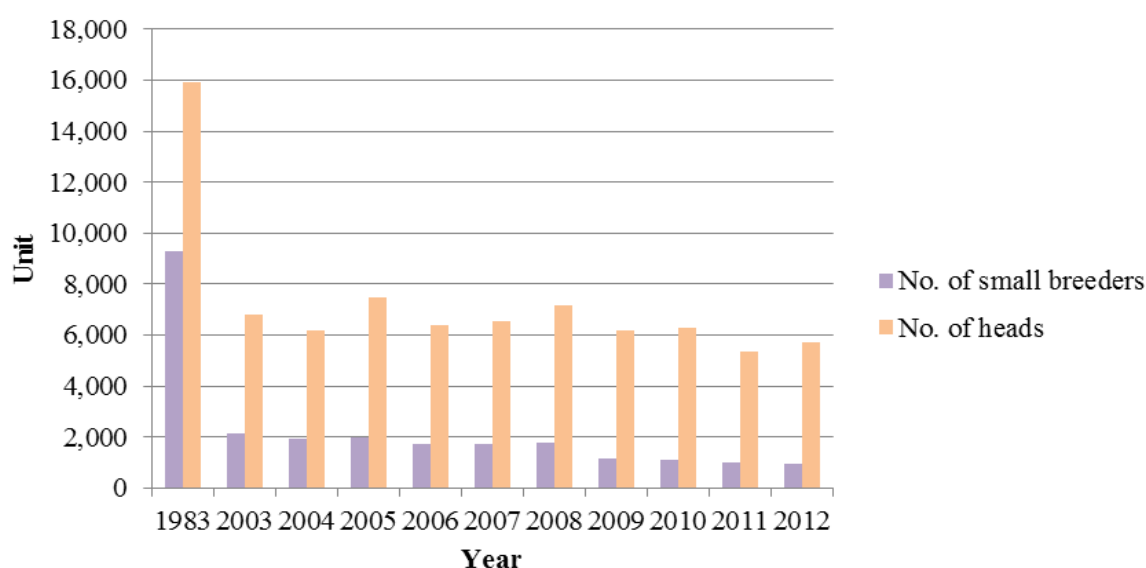
AREU figures show that as of January 2013, there were 657 small scale farmers with 2,438 heads (including 722 lactating cows) producing an estimated milk yield of 2.6 million litres annually. While some farmers (less than 10 percent) have grouped under cooperatives, they still operate on an individual basis.

Most of the cow keepers operate in a traditional method of production with low inputs and the sheds are located literally in the backyard of the owner's premises. Most of them own one to two cows which are permanently confined under poor housing conditions and sanitation. For these ruminants, feeding of fodder is done on a cut and carry basis. Fodder is not planted at all. They are collected daily by road sides, river banks, forests and fallow/bare lands. Sugar cane tops are available during sugar cane harvest season.

Industrialisation and the rapid development of other economic sectors on the island did not allow this segment to grow and the new generation does not view cattle rearing as an

¹Review of the Dairy Industry in Mauritius, *Imani Development Consultants* (June 2004), Blueprint for a Sustainable Diversified Agri-Food Strategy for Mauritius 2008 -2013, A Non-sugar Sector Strategic Plan 2003 – 2007 and Food Security Fund Strategic Plan 2013 -2015.

attractive way to sustain the family unit. Demographic growth and the lack of available space for rearing have, also, led to a lack of interest in cattle breeding. Over the last decades, there has been a sharp decline in the number of farmers and cattle as shown in Figure 2.



Source: Statistic Mauritius (SM)

Figure 2 – Number of small breeders and cattle heads (1983 – 2012)

2.2.2 Large dairy farmers (above 20 heads)

This category comprises individuals operating alone or under cooperatives, institutions and companies as tabled below. Like in the small holder dairy sector, here, also, farmers who have grouped themselves under cooperatives, continues to operate on an individual basis. Details are given in Table 1.

Table 1 Details of large dairy farmers as at January 2013

	Number	Total cattle heads	Cows	Heifers	Female calves	Bulls and male calves	Lactating cows
Individuals	7	215	100	36	17	62	75
Individuals under co-operatives	3	118	41	44	2	31	38
Cooperatives operating as entities	4	149	101	43	2	3	89
Institutions	1	154	56	38	6	54	28
Companies	5	1,485	1,020	152	57	256	609
Total	20	2,121	1,318	313	84	406	839

Source: AREU

As of January 2013, the herd size consisted of 2,121 heads with 839 lactating cows producing an estimated milk yield of 3.69 million litres annually. Of the five companies, two operate commercial dairy farms with an aggregate of 1,272 heads including some 550 lactating cows producing about 2.56 million litres of milk in 2012. Both of them use South African technical know-how and it is expected that they will become an important source for local milk in the future. It is further anticipated that these commercial dairy farms, with time, can become suppliers of breeding and fattening stocks.

In this category, one can name AREU which has a Research Station where 154 cattle heads including 56 cows, of which 28 are lactating ones are reared. The estimated annual milk production is currently 102,000 litres (all figures as of January 2013).

2.3 Milk production and imports

Local milk production accounts for a very small proportion of the country's demand for this commodity. Based on official figures available from Statistics Mauritius, the proportion varied from 1.9 to 3.2 percent during the past ten years and the island continues to depend heavily on imports to satisfy its demand. In recent years, our import bill for dairy products showed an increasing trend. From Rs 1.8 billion in 2005, it increased to Rs 3 billion in 2008, representing a rise of 66 percent, for a mere 2.7 percent rise in milk volume. This was largely due to food price hikes that the world witnessed in the years 2007 and 2008. A slight abatement was experienced in 2009 but, increase in international food prices in subsequent years caused import costs to continue rising. Milk and milk products are becoming expensive items to consumers and it is expected that such a situation will persist.

2.4 Goat sector

Goat is reared extensively for its meat for which there is generally a high demand during end of year festivities. Rearing is a part time activity for many farmers. Most of the goat farms in Mauritius are small sized holding from five to 20 heads. The goats on most of these farms are of local breed and to some extent crosses with exotic ones. It is a means of earning extra money without great investment. The animals are managed traditionally as a single mixed herd; weaning is rarely carried out – kids are left to grow with their parents and, also, young males and females of the same family are not separated. This results in the reproduction from the mating of close relatives (inbreeding).

The small holder goat population declined significantly from 72,696 heads in 1983 to 27,430 heads in 2012, representing a decrease of 62 percent. Following the same trend, local production of goat meat decreased from 56 tonnes (7,319 heads) in 2000 to 22.2 tonnes (2,680 heads) in 2009. In the years that followed, however, an appreciable increase was noted: 28.8 tonnes (3,450 heads), in 2010, and up to 45 tonnes (5,664 heads) in 2011. This has had a direct influence on the importation of live goats for slaughter which decreased from 2,727 heads (producing 40.7 tonnes of meat) in 2009 to 430 heads (six tonnes) in 2011. In 2012, the local production of goat meat, however, decreased to 35.8 tonnes (4,358 animal heads). *(All figures from Statistics Mauritius. Tonnages are based on abattoir slaughters only.)*

2.5 Constraints affecting the sectors

The regression and low level of development in the small holder dairy and goat sectors described above are due to a number of factors such as:

- Operating in residential areas. The correct application of stringent public health and environmental legislation inevitably impinges on further development. There is an acute shortage of land for further expansion. Population growth implies that sheds have to be razed off to make place for human habitations;
- Unavailability of breeding and fattening stocks;
- Lack of good quality fodder and high costs of compounded feed;
- Lack of economies of scale and high cost of production;
- Poor level of management and husbandry practices that lead to diseases and sanitary problems; and
- Low replacement of ageing farmers. Work opportunities and better remunerated jobs in other economic sectors such as industry, tourism and services are more attractive to younger generations.

Additionally, the dairy sector is marked by other limitations such as high investment requirements to start a farming business and low rates of return thereon, lack of land for fodder production and an unstructured market for milk disposal.

2.6 Sector policies, development strategy and plans

In spite of the various incentives and support provided since many years to increase the production of milk and meat, the country continues to be heavily dependent on imports. The dramatic increases in world food prices, in the years 2007-2008, prompted Government to think in terms of self-reliance for better food security and to build resilience on any future food crises.

Over the last few years, Government has come up with several plans with a view to giving new impetus to the livestock sector. Indeed, a number of measures have been enunciated in the *Strategic Options in Crop Diversification and Livestock Sector (2007-2015)* of August 2007 and the *Blueprint for a Sustainable Diversified Agri Food Strategy for Mauritius (2008-2015)*, dated July 2008. However, for lack of funds these strategies could not be implemented. In 2008, a new plan was developed by the Ministry – the *Food Security Fund Strategic Plan 2008 – 2011*. As a continuation of this plan, the *Food Security Fund Strategic Plan 2013 – 2015* was prepared in 2012. A brief summary of the documents mentioned here are given below.

2.6.1 *Strategic Options in Crop Diversification and Livestock Sector (2007-2015)*

This document proposes a programme for the crop and livestock sectors to significantly increase food and agricultural production in a competitive and sustainable manner by the year

2015 through innovative production methods, novel products development while opening access to new markets. It considers government policy for promoting access to agricultural land, agribusiness, good agricultural practice, improving food quality and safety, reducing dependency on import, promoting export, and ensuring food security.

2.6.2 *Blueprint for a Sustainable Diversified Agri-Food Strategy for Mauritius (2008-2015)*

The *Strategic Options 2007-2015* were discussed at a consultative meeting held in August 2007. Deliberations of the consultative meeting and additional inputs from various parties were incorporated in a Blueprint that defined the Sustainable Diversified Agri-Food Strategy. The document lists out the important species of farm animals and poultry that require promotion particularly for enhancing food security and all the backup measures necessary to achieve the objectives set.

2.6.3 *Food Security Fund Strategic Plans (FSFSPs)*

FSFSP 2008 – 2011.

This document highlights the actions which should be implemented over the financial period 2008-2011 to increase the country's food self-sufficiency level and hence, reduce its dependency on imports and build resistance against any future food crises. The plan was prepared and finalised by the Ministry in November 2008 and approved by government in mid-December 2008. Earlier, government had provided for Rs 1 billion for a Food Security Fund, in the 2008-09 budget and the full amount was credited to a special account.

The main measures elaborated in this plan to revitalise the local livestock sector are:

- Encourage farmers to expand to larger scale farming activities
- Provision of strengthened extension service, training and veterinary services.
- Application of integrated farming systems in the local context
- Ensure conformity to food quality, hygiene and safety norms of milk and meat
- Plantation of high yielding fodder varieties and its conservation

The fund is also geared towards contributing to the empowerment of small farmers through promoting their active participation and involvement in various projects related to their own development.

FSFSP 2013-2015

The objective set in the previous plan is reiterated in this document. With respect to milk and meat, a self sufficiency level of 10 and 15 percent respectively is targeted by the year 2015. To attain these goals, along with the measures mentioned in the 2008-11 plan, the Ministry is set to implement the following actions and incentives:

- Facilitating access to agricultural land
- Modernising existing and setting up of new livestock farms
- Facilitating access to existing and new schemes to motivate farmers for higher productivity
- Facilitating access to market

CHAPTER THREE

FOOD SECURITY FUND PROJECTS

This chapter examines the different projects financed by FSF. It includes the construction of the three model dairy farms and one goat multiplier farm.

3.1 Food Security Fund Committee

Following the establishment of the Food Security Fund, in July 2008, a Food Security Fund Committee² (FSFC) was set up to administer and manage the Fund. The FSFC is responsible, among other things, to examine projects and schemes in line with the FSF Strategic Plan. The implementation of the projects was carried out by a Project Implementation Unit (FSFPIU) set up in February 2009. The FSFC works in close collaboration with AREU and the Agricultural Services of the Ministry. These two departments provide the FSFC with every input and data necessary for implementation of the strategic plan.

For the livestock sector, a total amount of Rs 246 million had been provided under the Fund³ for the financing of various projects and schemes during the three-year period 2008-11. As at September 2013, three projects for model dairy farms, one for goat multiplier farm and some financial schemes were on track. Amounts disbursed for these totalled some Rs 64.6 million.

3.2 Model dairy farms

In order to encourage the small breeders to embark into a sustainable and environmentally friendly dairy enterprise, the FSFSP proposed the setting up of three model dairy farms. The other objectives of this project were:

- that the dairy farms will serve as a model for small farmers wishing to embark into milk production;
- they will act as a showcase for modern breeding techniques; and
- they will boost up the local milk production and, therefore, enhance food security in the country.

The herd capacity of each farm was set at 50 lactating cows. The conditions laid down for beneficiaries that would own and run the farms were that they should be duly registered associations or cooperatives with all necessary clearances and permits for, and proven track records in, livestock development. The FSFSP drawn with the help of technical committees named three cooperative societies at Petit Merlo(Belle Rive), Nouvelle Decouverte and Mare D'Albert as players in this project.

²The committee consisted, then, of representatives of the Ministry (whose Accounting Officer is the chairperson), Ministry of Fisheries and Rodrigues, Ministry of Finance, Mauritius Agricultural Marketing Cooperative Federation, Small Planters Welfare Fund, Mauritius Sugar Industry Research Institute, AREU and the Accountant General.

³Following a government decision, the FSF was restructured and as from 1st March 2010, projects/schemes previously financed from the FSF are met from the Ministry's budget.

For the project, all farm infrastructure and equipment required (shed, milking parlour, cooling tank, etc.) as well as provision for water and electricity were to be financed by the FSF. Moreover, agreements with the Ministry had to be entered for implementation of the projects.

3.2.1 Limited funding, cost sharing and revision of scope

In August 2010, the FSFC decided that as the Cooperative Society at Petit Merlo (Belle Rive) had secured all the necessary clearances for a livestock development project and, also, because of budgetary constraints, this project would be implemented in the first instance.⁴ Initially, an amount of Rs 10 million was available, then, for this farm project which consisted of the design and construction of a new dairy cowshed of an area of about 650 m² to accommodate 50 cows. However, at that time the project did not take off.

In 2011, following a reduction in the budgeted amount to Rs 4 million for the project, the scope of work was reviewed and downsized to cater for 30 cows only on an area of about 447 m². These parameters have been applied to all model dairy farms financed by the FSF. Moreover, the Scheme was revised from a 100 percent funding to a cost sharing one whereby beneficiaries would be given a grant representing 70 percent of their project values (maximum FSF contribution for any model dairy farm was set at Rs 4 million). The remaining 30 percent would have to be put in by the beneficiaries.

3.2.2 Implementation of projects

The FSF Strategic Plan had designated AREU as the implementing agency for the model dairy farms but the projects were initially carried out by the FSFPIU. Monitoring and supervision of works on site were carried out by the project team through site visits and surveys. The Agricultural Engineering Division (AED) was, also, consulted for their views and advice on technical matters. FSF certified and approved the claims for work done. The Ministry also approved the claims before payments were effected.

In performance terms, projects are said to be executed in an efficient and effective manner when they are delivered on time, cost and quality. The following sections assess whether the Ministry/FSF has been successful in achieving this.

Substitution of AREU by FSFPIU and low manpower resources

The two projects, at Petit Merlo and Nouvelle Decouverte, were carried out, in the initial stage, by the FSFPIU. However, the latter faced difficulties in handling the projects mainly due to shortage of staff and lack of experience in the construction of dairy farms. This resulted in the implementation of the projects to slow down. The project was eventually handed over to AREU in September 2010.

⁴ Prior to this decision, with funds available as from July 2009, payments for electricity supplies only were made in late 2009 on behalf of the two model farms at Petit Merlo and Nouvelle Decouverte. For the dairy farm at Mare D'Albert, the project could not be initiated as Building and Land Use Permit was still pending from the District Council due to residential areas in the vicinity.

Tendering and selection of Contractor

Initially the tender documents for design and construction of the Petit Merlo dairy farm were prepared by AREU and bids were launched in late November 2010. The two bids received were however, not responsive. With time, the Cooperative Society at Petit Merlo selected a builder for the construction of the model cowshed. Both the FSF and AREU were not involved in this selection. The promoter informed the Ministry about the builder in November 2011.

The Ministry was involved on the selection of contractors for the two farms at Nouvelle Decouverte and Mare D'Albert, but not for the farm at Petit Merlo. Clause 3(xvii) of the agreements signed between the Ministry and the first two named CSs requested the beneficiary to “*seek quotation from Contractors and submit to the Ministry for approval of the selected contractor.*” In the case of the Dairy Farm at Petit Merlo, selection of construction services and start of works (in September 2011) pre-dated the signature of the Ministry/CS agreement in December 2011.

As a major financier of a project, it is important for the Ministry to be involved in the different aspects and stages of implementation starting with selection of contractors by the promoter; the more so, as taxpayers' money are utilised for the funding.

Time and cost

As at October 2013, all three farms were not yet completed and the status of the projects was as follows:

- Petit Merlo Dairy Farm. According to AREU, 98 percent of the overall construction works were completed as at 22 August 2013. Scheduled for completion in mid-February 2012, the project was delayed due to lack of funds. The application for a loan of around Rs 1.8 million, approved by FSFC in October 2011, had never been released by Development Bank of Mauritius (DBM). On 7 June 2012 with the approval of the FSFC; AREU advanced Rs 500,000 to the promoter so as not to hinder the implementation of the project.

The beneficiary did not comply with the initial design of the building and modifications have been brought to it. Some new pens such as a bull pen have been constructed at a few metres away from the model farm whose dimension is unchanged. According to the FSFC, the cost of these additional pens will be met by the beneficiary. By April 2013, the full grant of Rs 4 million had already been disbursed and the construction of the farm was still not yet completed.

- The Dairy Farm at Nouvelle Decouverte. As at 15 August 2013, works were completed up to 95 per cent and by July 2013, a total amount of Rs 3.9 million (out of the total grant of Rs 4 million) had been disbursed. The construction of the farm was scheduled to be completed by 31 January 2013.
- The Dairy Farm at Mare D'Albert. As at 22 August 2013, 96 percent of the overall construction and civil works was completed and by July 2013, the full

grant of Rs 4 million had been disbursed. The construction of the farm was scheduled to be completed by 01 January 2013.(see Appendix I for more details)

Quality

Quality of construction works can be ensured through constant supervision. Such supervision should make certain that relevant construction standards are complied with and appropriate levels of workmanship are applied. The agreement (Ministry/CS) uses the verb “supervise” only once at Clause 4.0 – Role and responsibilities of the Ministry: “*The Ministry or any appointed representative is duly mandated to supervise, discuss and decide on its behalf on all issues during the duration of this agreement.*” The document does not specify the scope and depth of supervision to be exercised on the construction project.

I am given to understand that the work of AREU and FSF during the construction phase of the project was limited to monitoring progress of work; they assess whether advancements on the job match with money spent. The quality of materials used, workmanship and overall work done need also to be assessed. I was informed that some laboratory tests were caused to be made on materials utilised, but no test certificates could be produced to audit.

3.3 Goat Multiplier Farm

The FSFSP, also, includes the construction of three multiplier goat farms for the boosting of the goat sector. The objective of the project is to support and encourage the production of good quality breeding animals for sale to prospective farmers and to upgrade the local genetic stock. Each multiplier farm will have to sell 60 percent of all weaned kids to AREU or to farmers recommended by AREU for a period of three years at a price to be agreed by a Committee to be set up for that purpose. The farms need to be constructed only on State Land or on Land under the 1,000 Arpents Scheme⁵ managed by the Ministry.

In June 2011, the FSFC decided that the setting up of the first goat multiplier farm be given to a Cooperative Society at Mare D’Albert which was, then, the only beneficiary under the 1,000 A Scheme.

In late December 2011, AREU reported that the initial plan of the goat multiplier farm submitted to the Ministry had been modified by the beneficiary. To cater for more goats, the surface area was increased by some 57 m² and the project’s cost increased by Rs 466,200. It was understood that the additional cost would be borne by the beneficiary. The construction work has been completed and the maximum amount of grant of Rs 1.6 million for the project had already been disbursed. The farm was practically completed in May 2012. However, with the delay in the procurement of goats, the farm started its operation in April 2013 with a herd of 45 goats.

⁵In April 2008, an agreement was signed between government and a private association that required the latter to release a total area of 2,000 arpents of land from its corporate planters to government for agricultural diversification, among others. In the 2008-2009 budget speech, it was stated that 1,000 arpents of land would be reserved for food security purposes. Of these, a proportion would be devoted to livestock production. As at February 2011, government received five plots of land from the private association totalling 200 A, out of which 60 acres have been earmarked for livestock and dairy projects.

The implementation of this project followed the same pattern as for the Petit Merlo model dairy farm. The weaknesses highlighted on the latter project, for example the Ministry was not involved on the selection of contractor by the beneficiary, the absence of proper agreement with the builder for contract, inefficient project management and unclear supervision level on the project, were, also, relevant to the goat multiplier farm.

Conclusion

More than four years have lapsed since the construction of the model dairy farms and goat multiplier farms was announced in the FSF Strategic Plan 2008-11. These ambitious undertakings seek to boost up both the dairy and goat sectors. The model dairy farm project intends to encourage small breeders to embark into sustainable and environmentally friendly dairy enterprises, by showcasing modern breeding techniques and help boost up local milk production. The goat multiplier farm scheme, on the other hand aims to promote the production of good quality breeding animals for sale to prospective farmers and, thereby, to upgrade the local genetic stock.

The dairy project, however, has been marked by delay in funding, limited funds and further cuts in its financing. This caused the downsizing of a model dairy farm and a revision of its financing. Currently, construction works for the three farms planned are still in progress. Similarly, out of three multiplier goat farms announced for construction in the FSFSP, only one has been completed and is operational; start of construction works for another is imminent and the third is still under consideration.

On the first project for each sector, contract and project management by the implementing agency and Ministry were not properly addressed. Some improvements were noted on projects that followed after the FSF and AREU decided to oversee selection of contractors by the promoters and a model contract was introduced. However, important issues such as performance bond, insurance cover and supervision level were still missing or unclear.

Recommendations

The Ministry invested significant amounts of money on the construction of farms. Therefore it should ensure that value for (taxpayer's) money is obtained. This can be achieved by addressing the shortcomings using good project management practices in the implementation and monitoring of projects. For example properly drawn agreements between the beneficiaries and the Ministry can help to guarantee this. This can also be applied to all future works so that the objectives set for the projects may be attained.

Ministry's Reply

Adding extraneous monitoring and supervisory activities require additional resources and would significantly increase the cost and cause additional delay.

CHAPTER FOUR

FOOD SECURITY FUND FINANCIAL SCHEMES

This chapter examines some of the schemes financed by the Food Security Fund.

4.1 FSF Financing Schemes

To stimulate and boost milk and meat production, the FSF launched several schemes for the livestock sector, in December 2009, through which financial assistance were offered to construct/renovate farm houses, purchase equipment, import improved genetic breeds of animals and cultivate fodder. As at September 2013, some Rs 48 million have been disbursed as loans and grants on five schemes related to the cattle and goat sectors as shown in Table 2.

Table 2 Disbursements under FSF financial schemes as at end September 2013

Scheme	Amount disbursed		
	Loan (Rs)	Grant (Rs)	Total (Rs)
Purchase of cow/heifers	11,976,640	8,700,000	20,676,640
Purchase of goats	812,500	812,500	1,625,000
Purchase of equipment	3,300,000	-	3,300,000
Construction/renovation of building	19,309,277	-	19,309,277
Fodder/pasture development	-	3,353,597	3,353,597
Total	35,398,417	12,866,097	48,264,514

Source: Food Security Fund

One scheme pertaining to the purchase of bull for fattening was put in abeyance by the Ministry. To run the schemes, AREU has been mandated to provide assistance to the FSFC. AREU's extension service is responsible, among others, to assist and advise farmers wishing to take advantage of the scheme(s), to investigate and evaluate applicants' requests (all applications are directed to AREU) and to submit an evaluation report to an Evaluation Committee, under the FSFC. After analysis by the Evaluation Committee, eligible applications are approved by the FSFC and forwarded to the banks which in turn assess the creditworthiness of the applicants before granting a loan and payment of grants. After loans and/or grants have been disbursed, follow up action on implementation of projects is carried out by AREU and FSFC. A report by AREU on the status of projects is submitted to FSFC on a monthly basis.

Details of the FSF Financing Schemes are shown in Table 3.

*Table 3 Financing schemes under FSF for the livestock sector**

Scheme	Beneficiary	Grant amount	Loan amount	Terms and condition for loan
I. Purchase of dairy heifers/cows^a	Group of farmers	Rs 30,000/heifer	Rs 57,000/heifer (limited to a maximum of 50 heads)	Annual interest rate: 3% Repayment over 5 years.
II. Purchase of goat^b	Group of farmers	Maximum of 50% of purchase price or Rs10,000/head.	Maximum of 50% of purchase price or Rs 10,000/head (limited to a maximum of 50 heads)	Annual interest rate: 3% Repayment over 5 years.
III. Purchase of equipment	Group of farmers	Nil	Maximum of Rs 3m for one equipment or Rs 5m for more than one equipment.	Annual interest rate: 5% Repayment over 8 years
IV. Construction and renovation of farm buildings	Group of farmers	Nil	Maximum of Rs 3m/applicant	Annual interest rate: 5% Repayment over 8 years
V. Fodder plantation	Group of farmers/ individual	Maximum of 50% plantation cost or Rs 17,000/arpent. Applies to extent of one to 25 A	Nil.	Maintain plantation for a minimum period of 5 years

Source: Food Security Fund

^aOriginally, the scheme was designed for importation of cows, too, and amounts payable were set as follows: Grant – Rs 20,000/heifer and Rs 30,000/cow, and loan – Rs 30,000/heifer and Rs 40,000/cow. In January 2011, it was decided that cows will not be imported (see 3.2.1 below) and grant and loan for one pregnant heifer were revised to Rs 30,000 and Rs 40,000, respectively,. In February 2012, the loan amount was further revised to Rs 57,000 per pregnant heifer.

^bScheme II, also, concerns purchase of sheep. In this report only goat is being covered.

*as from January 2014 the method of financing the scheme changed. Only grants are provided.

Eligibility criteria set to benefit from the above schemes were as follows:

- Applicants should form a group (a cooperative, an association or a company). For scheme V, individuals were, also, invited to apply;
- Group should be the owner or lessee of land to carry out the livestock activity;
- Water and electricity facilities should be available on site;

- A business plan should be submitted;
- All the necessary permits (building and land use, and PER⁶) should be available;
- Housing for the animals should be according to the norms set by FSF; and
- Applicants should subscribe to bank conditions. Banks require securities prior to lending money.

4.1.1 Changes to Scheme I

Representatives of the DVS informed the Ministry that cows cannot be imported as milking of the cows during travel period will be a problem. It was decided that only pregnant heifers between four to five months will be imported.

4.1.2 Difficulties for applicants

Unfortunately, applicants have had to face difficulties to satisfy the above criteria. They could not group into cooperatives, associations and form companies (see 4.2 below). Most of the farmers as well as some existing cooperative societies were not holders of title deeds/lease certificates and relevant permits. They even had difficulties in subscribing to bank conditions.

Interested applicants wishing to import animals were unfamiliar with import procedures and were facing difficulties in obtaining appropriate shipment for the transport of the animals. To remedy the situation, the Ministry took the responsibility, in February 2010, to import the livestock species on their behalf

4.2 Clustering and difficulties of farmers to group themselves

Government investment policy in the livestock sector has always put great emphasis on development through groups to help communities to take collective action to increase production. One of the salient features of the FSF Strategic Plan is the clustering of farmers and the above financing schemes are being implemented to encourage small breeders to group themselves and benefit of the advantages of clustering.

Clustering is an innovative method of organising small farmers into small groups called “clusters”. The members in a cluster agree to develop an agro enterprise (association, cooperative or company) and proactively plan farm production according to a marketing objective. In due time, clusters may expand in membership or coverage. The benefits of clustering are:

⁶ Preliminary Environmental Report (PER) is a short form of an Environmental Impact Assessment (EIA) and is a tool to ascertain whether a project can go ahead as proposed or whether there are sufficient likely significant adverse environmental impacts to warrant a full EIA. Undertakings which by their very nature are not highly polluting require the approval of a PER.

- Farmers grouped into associations can mobilise capital, pool knowledge and facilitate ‘modern’ technology adoption and achieve higher productivity in operations with greater economies of scale;
- Clustering allows better access to markets and better bargaining power; and
- A clustering mechanism provides a proactive interactive interface between the public and the private sectors fostering a spirit of shared responsibilities and benefits.

Presently, there are 22 cooperatives⁷ operating in the dairy cattle sector. Pooling of resources has not paid off as milk production is still at a low level. In 2012 it represented only three percent of the country’s total demand. AREU identified that the principal reason for this failure is the individualistic attitude which prevails among the farming community in general. Individual farmers who have grouped under the existing cooperatives still operate on an individual basis; milk is produced and marketed individually. This individualistic attitude, mentioned earlier, that has prevailed for so long, is hampering the smooth functioning of the dairy cooperatives. Another reason why small farmers find it difficult to group together is a lack of know-how to make clustering effective. This indicates that efforts made, and facilities extended to them, by Government did not achieve the expected results.

Recommendation

Given the advantages of clustering, it is important for the Ministry of Agro-Industry and Food Security to work along with the Ministry of Business, Enterprise and Cooperatives to review the cooperative system in the agricultural sector, find out the shortcomings of the dairy cooperatives and develop ways to resolve same. Special attention must be given to finding means of making breeders take a more active part in developing the kind of association and activities that promote livestock production – turning existing cooperatives into successful ones and establishing new more efficient and effective associations. One of the areas where much effort will have to be made is sensitisation, education and training so as to encourage farmers to cooperate with other fellow farmers to aim for higher productivity and achieve greater economies of scale.

Ministry’s Reply

Mauritius is still in the learning process and the present environment is not fully conducive to favour clustering. This cannot be achieved over a short time.

4.3 Importation of animals

Currently, Scheme I (purchase of dairy cattle) and Scheme II (purchase of goat) are on track. As at June 2013, applications for a total of 635 heifers and 220 goats (and 50 sheep) were approved by FSF. For Scheme I, the FSF entrusted the responsibility to import animals initially to the APD and later to the Mauritius Meat Authority. However, both endeavours did not materialise.

⁷Information available on 20 of them show that 14 were created as from 2007, four were formed during the years 1998 through 2005, and two exist since 1991. (*Source: AREU*)

As the Ministry was experiencing difficulties to import animals, other alternatives were explored. These, opportunity that arose and their outcomes are shown in Table 4.

Table 4 Action taken and outcome on the importation of animals

Date	Action taken/Opportunity	Outcome
February 2011	Three companies including the two large commercial dairy farms contacted to source animals from them.	Companies stated that they cannot sell any of their animals at this stage
10 May 2011	1 st expression of interest launched in the local press to invite potential suppliers to import animals for breeders.	No bid received by closing date (31 st May 2011)
29 June 2011	2 nd expression of interest launched.	Four companies responded by closing date (12 July 2011)
August 2011	Possibility to import through one large dairy company arose.	Any tender exercise involving the above four suppliers not pursued.
September 2011	7 applicants placed order for importation of 240 pregnant heifers through the large dairy company.	240 pregnant heifers of Jersey breed imported from South Africa in early October 2011
April 2012	3 rd expression of interest launched.	Two suppliers responded by closing date (30 April 2012)
May 2012	AREU informed breeders interested in the supply of pregnant heifers to liaise with the two suppliers and come up with their own agreements with them.	A meeting was held on 30 May 2012 by AREU between the two suppliers and some breeders. Proposals of the former were not accepted by farmers on account of price or absence of history cards.
May 2013	4 th expression of interest launched. Set of three expressions of interest launched for the supply of: <ul style="list-style-type: none"> (i) around 100 dairy heifers per year from already established local dairy farms and from new promoters willing to invest in heifer production⁸ (on 22 May 2013); (ii) around 275 pregnant heifers⁹ (on 29 May 2013); and (iii) 200 breeding goats and 15 bucks¹⁰ (on 13 May 2013). 	<p>At closing date on 28 June 2013, only one Australian supplier responded.</p> <p>At closing date on 1 July 2013, only one bid was received from Australia.</p> <p>At closing date on 13 June 2013, only one supplier responded. 256 Goats and 6 bucks of Boer breed imported from South Africa by supplier. Animals landed in Mauritius on 30 June 2013.</p>

Source: Ministry's Records

⁸ Originally, it was agreed that AREU would set up a Heifer Reproduction Farm, at its Livestock Research Station, to address the shortage of dairy animals. It was later decided to let the private sector run this activity. Consequently, the expression of interest was launched. A provision of Rs 5.5 m has been made for this project, in the 2013 budget.

⁹ AREU submitted a list of 10 beneficiaries with a request for about 300 dairy heifers. The Ministry and AREU worked out an expression of interest for the supply of around 275 pregnant heifers. A sum of Rs 6 m has been earmarked in the 2013 budget.

¹⁰ AREU informed that there were about six farmers who were interested to purchase some 220 goats. The expression of interest, also, concerns the supply of 100 breeding ewes and 5 rams. A sum of Rs 2 m has been earmarked in the 2013 budget.

For the import of animals, through the large dairy company mentioned above, loans and grants amounting to Rs 8.8 million and Rs 6.7 million respectively were disbursed by the DBM. Following this payment, only 180 animals could be procured by the beneficiaries in November 2011. The cost of one pregnant heifer turned out to be Rs 87,000 i.e. higher than the amount of grant and loan (totalling Rs 70,000) offered for an animal. The remaining 60 animals could not be purchased for lack of funds. Following requests from the beneficiaries, the FSFC, in November 2011, followed by government, in February 2012, agreed to revise upwards the ceiling for the loan to Rs 57,000. Thus, the total funds given under this Scheme is, presently, Rs 87,000 per animal.

As at June 2013, only part of the stock of dairy animals (about 46 percent; 290 out of 635) and all goats (220 heads) have been imported for breeders whose applications were approved. Over a period of two years (May 2011 to May 2013), four expressions of interest have been launched to invite both local and international firms to supply the needed animals. The outcomes on the first three were either not positive or received no further attention. Proposals received on the fourth relating to dairy animals were still being examined by the FSF. For the three expressions of interest launched in May 2013, the Ministry will act as a facilitator only and farmers will be requested to liaise with the supplier(s).

Recommendation

The Ministry should explore other possibilities for applicants/farmers to group themselves, say, in an association with the only purpose of importing their animals. APD and DVS can advise on selection criteria.

Ministry's reply

The Mauritius Meat Authority has now taken the initiative to import animals on behalf of the breeders.

4.3.1 Risk and fear associated with importation of animals

The importation of animals involves the risk that they do not perform well in the importing country. Should this be the case, breeders will find themselves with poor returns and heavy liabilities having contracted loans for the purchase of the under-performing animals. Dissatisfied farmers tend to criticise the importation process and blame the parties involved in it for this failure, and, also, claim compensation. The experience with imported Australian heifers at the cost of Rs 16 million in 1996 by the Ministry is worth noting here. Out of the 400 ought-to-be-pregnant heifers imported, only 219 were pregnant. The performance of the animals was far below the expected levels with low milk yield (three to five litres of milk per day), wild behaviour, health problems and mortality. Following complaints from farmers, the Ministry had to take necessary action to refund them animals from Government's Palmar LPU or had to help them clear their liabilities with banks and other funding sources.

4.3.2 Purchase of goat (and sheep)

In March 2011, FSFC reviewed Scheme II, purchase of goat/sheep, to include purchase of animals from Rodrigues. It was felt that there was an acute shortage of breeding *does* and that, like for Scheme I – Purchase of dairy heifers, attempts to import breeding stock were lengthy and tedious. One of the requirements for procurement of high quality breeding stock from Rodrigues was that it should be accompanied by a certificate from the Office of the Commission of Agriculture of Rodrigues attesting that the animals are according to specifications as follows:

- tagged with unique identification numbers to ensure good control over breeding;
- originating from farms adopting good husbandry practices;
- males and females should not be related (they must originate from a minimum of two different farms);
- of the right age (12 to 18 months old); and
- dewormed and in good health.

Performance records (on birth weight and litter type), pedigree records (on fertility and prolificacy of dams) and information on abortions and still births for each dam should also be made available.

According to the Eligibility Criteria and Conditions of the Agreement signed between the DBM and the beneficiary, under the FSF scheme, “*the beneficiary shall not be authorised to sell any goat financed for reproduction before the 5th year following its date of purchase*” and “*failure to honour this condition will entail the immediate refund of the grant as well as that of the loan, if applicable, of the animal concerned on a pro-rata basis starting from the date it has been sold.*” The agreement further stipulates that this clause does not apply in case of death of an animal certified by a qualified and registered veterinary surgeon or in case the latter has officially diagnosed that an animal should be reformed.

One company purchased 60 goats (and 55 sheep) in April 2011 and another co-operative society purchased 48 goats in December 2012, from Rodrigues.

Import for the Company

The FSF disbursed Rs 1 million in December 2011 as grant and loan for the company’s purchase while, in April 2011, AREU had recommended payment of only Rs 576,666. A total of Rs 423,334 was, thus, overpaid to the company.

Site visits made by AREU at the company’s farm following the purchase of animals revealed that the stock had been continuously decreasing to reach 16 animals in 2013. The Company was unable to furnish plausible reasons to justify the reduction. At a meeting in May 2013, it was agreed that the DBM would initiate legal action to recall loans and grants disbursed to beneficiaries who have not implemented their projects as expected; non-implementation would be confirmed by AREU following site visits. As of October 2013, neither had any initiative been taken by the Ministry to claim back the amount overpaid to the company nor

any measure taken to recover loans and grants disbursed to it for non-implementation of its project as expected.

Import for the Cooperative Society (CS)

On 19 September 2012, the FSF Evaluation Committee had approved the purchase of 45 *does* and recommended disbursement of grant and loan totalling Rs 625,000. This batch of animals had been certified, by the Veterinary Services of Rodrigues in August 2012, to be in good health. These animals, however, could not be imported as the selling farm(s) in Rodrigues had disposed of same to other buyers. The CS, thereafter, decided, on its own, to purchase another batch of 48 goats from Rodrigues. As no report from the Veterinary Services of Rodrigues was available for these animals, it could not be ascertained whether the new batch met FSFC specifications.

The FSFC relaxed its rules and, at a meeting held on 25 January 2013, approved the exceptional waiving of the specifications on record performance as the CS had already purchased the new *does*. At the same meeting, the FSFC agreed that the amount of grant and loan approved for the first batch of goats (Rs 625,000 for 45 animals) be paid to the CS for the new batch (of 48 animals), already purchased and imported. This sum was disbursed in mid July 2013.

The following are observations and comments on the above:

- One of the objectives of providing financial assistance under the FSF is to boost meat production through the importation of animals of improved genetic breeds. The absence of performance records requested or the waiving of this requirement did not help in establishing the quality of the breeding stock purchased.
- Animals received in Mauritius for the company were untagged. Tagging had to be carried out by the DVS.

Recommendation

Only animals that meet the criteria set by the FSFC should be approved for importation.

4.3.3 Adaptability of imported animals

Dairy animals with high genetic potential for milk production always remain the prerequisite for development of this sector. Efforts are being made to increase animal output through import of exotic breeds' animals under the FSF financing schemes. An evaluation of imported animals in the past showed that these animals experienced problems adjusting to climate, feed resources and management levels. The foreign breeds have been proven to be highly productive in their country of origin. In adapting itself to the new environment, the breed loses many of the performance characteristics that distinguish it in its native land.

Studies have shown that, generally, existing indigenous breeds are well adapted to local conditions.¹¹

It is very important to analyse past case studies from which lessons can be learnt. The case of Australian heifers imported by the Ministry is worthy to be noted. The difficulty of these high-output dairy cows to adapt to our local climatic conditions and management system resulted into unsatisfactory performance.

The two large dairy commercial farms have imported animals of Friesian and Jersey breeds from South Africa. Their systems of management are more or less similar to conditions as in the animals' country of origin. These allow the animals to perform satisfactorily. The Ministry intends to import/has allowed the importation of the same breeds, but with less demanding output levels – levels that match the environment and conditions in which the animals will be kept by cooperatives, associations and small farmers. For example, animals that have been approved for importation by the seven Cooperative Societies through one of the large dairy farming companies are expected to produce 4,000 to 5,000 litres of milk over a 300 days lactation period.¹²

However, the setting of criteria for animals to be imported based on differences between different farm management systems excluding the ruminants under certain systems, may not be appropriate. Testing of animals of different breeds and performance standards under different local rearing conditions (at selected cooperatives and small breeders) for a suitable length of time would have been more appropriate. A practical approach would have allowed selection of those animals that adapt more easily to their new environment and perform satisfactorily for the setting of import criteria. This method would, also, have given assurance to the Ministry that value for money spent as grants and loans will be obtained, and to breeders, that return on investments made will be received. It should be further pointed out that animals purchased are of the Jersey breed – a breed that the cooperatives are not fully used to rearing. In Mauritius, Friesian animals are widely bred by cooperatives and small farmers; the Jersey breed producing milk with higher butterfat content compared to the Friesian breed is mainly reared by the large dairy farming companies. As the test approach had not been applied, both the Ministry and the cooperatives which have imported pregnant heifers were condemned to wait and see how the animals fare over time.

The waiting was not long and performances not encouraging. In April 2012, AREU reported that out of the 180 imported animals, 25 died, 20 aborted, 96 calved and milk production turned around 500 litres per day (an average of 5.2 litres per head/day). A year later, as at May 2013, 10 more died or were culled, a further nine aborted and an additional 26 calved; milk production stagnated at five litres per head per day (1,500 litres per lactation). This low performance is attributed to several factors such as poor body conditions of some animals, health problems (mastitis, bloat, teat canal blocked etc.), inadequate management especially on feeding practices, difficulty of animals to adapt to the local condition and deaths. As a

¹¹“Low demand animals for low input systems” by *Wolfgang Bayer*, “Choice of genetic types for specific production environments and production systems” by *NtombizakheMpofu*, Zimbabwe (2002) and “Cattle and livelihood in Bangladesh” by *A K F H Bhuiyan*, Bangladesh Agricultural University.

¹²It has been reported by AREU that the large dairy farming companies import the same Jersey breed of dairy cattle that has been bought by cooperatives in November 2011 and the animals can potentially produce 4,000 to 5,000 litres of milk per lactation. However, AREU could not ascertain that the animals imported for cooperatives are of same quality as no history cards of animals are kept by the large dairy companies and cooperatives.

result of these problems, beneficiaries indicated to AREU that they are no longer interested with the 60 remaining animals held at the large dairy company. Proposals were, also, made by breeders for the Ministry to compensate them for mortality of heifers, to negotiate with the supplier for replacement of those heifers which have aborted, to be allowed to buy animals from other sources and to review the loan repayment period.

4.3.4 Need to import animals

The need to import animals arose from the closure of the Palmar Livestock Production Unit. Until mid-2008, the Palmar LPU, operated by the Ministry, was the only source for procuring breeding animals in Mauritius. While in operation, on average, 100 dairy cattle and 65 goats could be sold to farmers at concessionary rates annually. In May 2007, Government decided to close the Palmar LPU and in August 2008 it ceased its activity. Government purported that the objective of providing breeding stock to small livestock farmers would be achieved through other means and sources like contract farmers, multiplier farms and the prisons' farms.

The above assertion could not be translated into fruitful actions for the benefit of farmers. Young breeding animals could not be produced at the abovementioned sources to meet the increasing demand of breeders. According to a survey carried out by AREU, in mid-2010, on behalf of the FSF, to measure demand for imported breeding stock (as local supply was none or close to negligible), 61 farmers expressed their need for 1,500 dairy cattle and 600 goats. Attempts had been made by the Ministry to facilitate production by private farmers through the concept of multiplier farms, but were not successful.

Production through multiplier farms

Following the closure of the Palmar LPU, animals from the station were sold to private farmers for breeding with a view to re-supplying young animals (cattle, goats and pigs) back to the APD for onwards re-sale to other farmers. Agreements were entered with 118 multiplier farms which obtained breeding/fattening animals (cattle and goat) from the Palmar LPU. The APD was responsible for the monitoring of the evolution of the animals and herd status through regular site visits. Advice on many aspects of farming such as housing conditions, animal husbandry practices and nutrition was, also, given during the visits. Results following two years of rearing are shown in Table 5.

Table 5 Herd status and progression of animals at multiplier farms

Species	No of farmers	Period 2008 – June 2010**				
		No of animals received from Palmar LPU in 2008	No of births	No of deaths	No of animals sold	No of animals left
Cattle (Dairy)	77	127	43	27	17	126
Cattle (Boran)	9	83	39	6	2	114
Goat*	32	138	71	55	0	154
Total	118	348	153	88	19	394

*Figures are for periods 2008 and 2009 only.

** no statistics was available after June 2010

Source: APD Annual Report 2010

There was no significant increase in the number of heads, a rise of 13 percent only after two years of operation. *The most important statistic was that no progeny was transferred back to the APD*. According to APD the above performance of the multiplier farms is attributable to an inability to manage and enforce the contracts entered with the farmers as none was registered with the Registrar General's Department. APD had practically no control on farmers' activities.

The initiative by the Ministry to rear animals through multiplier farms so that other farmers may be procured with breeding stock was a laudable one. However, for a failure to make contracts enforceable, the anticipated supply of breeding stock from these multiplier farms has not been achieved. APD ceased to follow up on the project as from January 2011.

The Palmar LPU was closed in mid-2008, at a time when international food prices were soaring to unprecedented levels and Mauritius faced serious difficulties of food (including milk) supply and security. The availability of breeding stock is a pre-requisite for increasing livestock production and related products. Since mid-2008, no local breeding stock is made available for the breeding community, especially the small farmers. Presently, importation is the only alternative to get breeding stock. However, the Ministry is experiencing difficulties in adopting this option.

4.4 Fodder plantation scheme

One of the reasons for the livestock industry not to take off as expected has been the lack of pasture areas. To resolve this shortcoming, the FSF is encouraging the plantation of fodder by providing financial aid.

As at end June 2013, 82 percent of applications (31), received under the FSF financial scheme, have been approved representing a total acreage of 271.45 acres. As at the same date, the total amount of grant approved and disbursed amounted to Rs 4.2 million and Rs 3.4 million respectively. Information available on 30 beneficiaries show that, as at

15 March 2013, 182.65 acres of land have already been planted with fodder and a large part is being harvested. Details are shown in the Table 6.

Table 6 Status of pasture areas under the Fodder plantation scheme

No of beneficiaries	Area (acres)	Status/Remarks
5	87.5	Being harvested – used as grazing land (deer farming – 50A; cattle rearing – 25A; goat rearing – 12.5A)
8	31.8	Being harvested – cut and carry basis to feed 240 cattle heads, 50 goats and 40 sheep.
3	43	No animals, fodder harvested and sold to other farmers
8	20.35	Fodder not yet reached maturity stage
24	182.65	Total acreage planted and being harvested
	34.95	Acreage yet to be planted by the 24 beneficiaries
6	48.85	No plantation due to problems with land ownership. Half of grant amount disbursed between April 2010 and November 2011.
30	266.45	

Source: FSF/AREU

While most applicants will keep their fodder to feed their own animals, those with no animals are selling their produce to other farmers. It has been reported that there is a demand for fodder from the corporate sector and two fodder planters have already sold some 800 tonnes to the large farming companies.

Of the 30 beneficiaries, nine are, also, linked with importation of animals – six for 250 dairy cattle and the remaining three for 75 goats and 50 sheep. The nine beneficiaries have already planted some 79 acres¹³ of land with fodder and of them, eight, also, have animals. Animals owned by the latter are either existing livestock or newly imported ones¹⁴. In one case, one applicant who had planted fodder on 4½ acres of land had to offer fodder which was ready for harvest freely to other farmers as the applicant was still awaiting importation of 50 pregnant heifers. With the acquisition of 13 heads of cattle on the local market, the produce is now fed to his own animals.

Unless breeding stock (cattle, goat and sheep) is imported/made available at the earliest, there is the risk that fodder planted by recipients of grants may be underutilised and lost. This will be equivalent to a loss of grants paid by the FSF.

¹³ Total acreage approved for the nine beneficiaries is 88.3 Acres.

¹⁴Of the 250 cattle heads, 200 have already been imported by a private company for four beneficiaries (cooperative societies). However, only 125 animals have been delivered to them due to unavailability of funds (see section 4.3).

Conclusion

The financing schemes under the FSF are proposed to farmers grouped under cooperatives or in associations. They are, also, intended to encourage farmers to cluster and benefit of the advantages of grouping. However, before launching the schemes, the Ministry did not carry out any sensitisation or education campaign for farmers on clustering and its benefits. No survey was carried out to see how many farmers would be interested to group or cluster.

Making subsequent changes to a scheme indicate that it was not well planned. A lack of coordination was, also, noted on the implementation of the schemes. Plantation of fodder had been financed and had progressed significantly, so much so, that large extents of land could be harvested, but only few animals could be imported to feed on same.

More than three and a half years after the introduction of the schemes, little has been accomplished in their implementation. As matters stand, the FSF has not been able to import any dairy animal on behalf of farmers. The FSF is still working on ways to procure dairy animals, through pregnant heifers' importation or heifer production/supply, for the breeding community. Success has been registered on the import of goats after purchases from Rodrigues were allowed and more recently, when an expression of interest proved fruitful. Breeders of other species have to wait for positive developments on other schemes before they can be procured with their own animals; no schedule for importation of animals has been or could be set. This situation adversely affects the morale of farmers who have waited for years (and are still waiting) for their animals and leads to discouragement of the applicants. In the absence of breeding animals the objective of increasing milk and meat production is not achievable in the short term.

Recommendation

It is important for the Ministry to coordinate and synchronise the implementation of its schemes so that there is no risk of any mismatch between plantation/availability of fodder and importation/availability of animals to feed on same.

CHAPTER FIVE

GOAT FARMING

This chapter examines the current goat farming practices and focuses mainly on inbreeding.

5.1 Goat farming in Mauritius

In Mauritius there is an increasing demand for goat meat. Local production of the meat is not enough to meet our consumption. We rely heavily on imports to meet our need. There is, thus, a huge market that can be served by local breeders and significant economic returns to be reaped.

According to AREU, the goat rearing activity is carried out by only one category of farmers: small scale one. As of June 2013, there were 3,000 farmers rearing some 28,000 animals; each breeder owns between one and 100 heads and the average herd size is nine.

The majority of the goat keepers operate on a part time basis and they lack the managerial skill and technical know-how to operate a farm efficiently, particularly breeding. On most farms, animals – bucks, does, young males, young females and kids – are reared as a single herd. Animals are allowed to freely mix together, irrespective of sex, age groups and relationships; members of an extended family – grand-parents, parents, grand children, kids, brothers, sisters, etc. – share the same shed. Under these circumstances, there is often no controlled breeding, but inbreeding and premature mating.

5.1.1 Inbreeding

Inbreeding is the reproduction from the mating of two genetically related parents. Genes comprise of dominant and recessive (weak) traits. When the genomes of pair-mates are more similar, recessive traits (if present in both parents' genomes) will appear in the offspring, resulting in very unfit individuals. Indeed, inbred individuals are more likely to show physical and health defects, including:

- loss of immune system function;
- slow growth rate, smaller adult size and, thus, low carcass weights;
- higher frequency of hereditary defects (due to increased genetic disorders);
- high risk of kid mortality;
- poor reproductive efficiency of animals; and
- lower birth rate.

Inbreeding generally leads to inbreeding depression i.e. a reduced fitness of a population or an overall lowering in the performance of a herd on account of loss of genetic diversity. The higher the degree of inbreeding, the greater is the reduction in performance.

5.1.2 Premature mating

Young males become sexually active as from three to four months of age. Presently, the traditional methods of rearing favour inbreeding and premature mating. This premature mating has negative impacts and result in the performance of large proportion of the local herd to be low. The average carcass weight per head for local goats is, presently, 7.1 kilograms. This is very low compared to an average carcass weight of 17.5¹⁵ kilograms per head for imported goats.

5.2 Setting up of a Caprine Artificial Insemination Unit

With a view to improving the genetics of the local herd, the APD has already embarked on the setting up a Caprine Artificial Insemination Unit. The project involves the setting up of a small Caprine Artificial Insemination (AI) station with ten imported male goats. Semen will be collected from these animals, processed and used to inseminate does Chinese expertise has been solicited for this project and a team is expected soon in Mauritius. Initially, technical assistants of APD will be trained by the Chinese experts to master the AI techniques and do the inseminations. With time, goat farmers (starting with progressive minded ones) will be trained to take over this task; semen straws will be made available at APD. The FSF approved this project in August 2011 and funds totalling some Rs 1 million have already been secured to meet costs of infrastructures (shed), import of breeding bucks, creation of pasture ground, feeds, drugs, equipment for AI and consumables.

As a start, three pedigree certified Boer male goats and three local female goats have been purchased. A shed has been adapted to house the animals and equipment for the AI unit have been purchased or received as donation from China. Setting the unit has cost the APD some Rs 475,000 as at October 2013.

The implementation of this project is, however, premature, for two reasons:

- The introduction of high quality genetic material into a population will be of little use *if inbreeding is not stopped*. Animals born following the AI are more likely to have good health, be in better shape and perform well as they benefit from genetic diversity and, thus, manifest hybrid vigour. Unless, breeding is controlled for these animals, the superior traits inherited will be gradually eroded. If they begin to inbreed, congenital effects will appear, both physical and reproductive (as mentioned earlier), in offspring. As from the first generation of inbred individuals themselves, physical and health defects become apparent. As inbreeding continues with successive generations, there is bound to be loss of genetic diversity and this fast tracks the whole herd to overall low performances.
- Under the FSF financing scheme – “Purchase of sheep/goat”, approval has already been given for the import of improved genetic breeds. The crossing of these animals with local goats will help to improve the genetics of the local herd. Genetic improvement, richness and higher performance will be assured if inbreeding is prevented.

¹⁵ Source: Food Security Fund Strategic Plan 2008-2011 & APD

Recommendations

- *Farmers should be made to redefine their objectives for rearing goats.*

The huge existing market that can be supplied with local goat meat and enormous financial gains that can be realised in the process should be clearly highlighted. Increase in local production to cut down imports and enhance our self sufficiency and food security levels should be aimed at.

- *Efforts should be concentrated on combating inbreeding.*

It is very important to educate farmers on the negative impacts of inbreeding and premature mating. The damage done to the herd – loss of genetic diversity and inbreeding depression – through poor, traditional reproductive management practices should be stressed. Radical changes should be brought in the mindset of farmers who have, for too long, been complacent with their breeding practices. A clearly defined breeding policy devoid of inbreeding and premature mating should be instilled in farmers.

Continued education and training of goat farmers on good farming practices with due attention on housing, reproduction and record keeping should be done. Follow up at field level should be ensured. The following could be considered:

- The goat shed to be partitioned (with fences or simple wooden barriers) to keep males and females separated to prevent inbreeding and premature mating. Kids should, of course, be left with their mothers until weaning.
- Appropriate males should be selected for breeding purposes. The breeding pair should not be closely related and should be physically and sexually mature animals. Farmers should be encouraged to exchange or trade their animals. This will ensure outbreeding which will enrich the genetic pool, upgrade the herd and improve goat production.
- Records should be kept on each individual animal. This will facilitate the application of proper controlled breeding programmes and help evaluate herd performance and farm progress.
- On farm demonstrations should be effected at the level of progressive farms for exchange of personal experiences and better uptake of the new practices. These coupled with appropriate support services should allow farmers to witness the improvements that result.

Ministry's reply

Inbreeding is a result of bad farm management. Effective training programmes have been set up at the level of relevant institutions to remedy this situation.

Model Dairy Farms construction project

<i>Farm/Location</i>	Dairy Farm at Petit Merlo (Belle Rive)	Dairy Farm at Nouvelle Decouverte	Dairy Farm at Mare D'Albert
<i>Financing</i>	On a 30:70 cost-sharing ratio between the beneficiary and the FSF/Ministry*		
<i>Contractor</i>	Private contractor selected by CS	Private contractor selected by CS in September 2012.	Private contractor selected by CS in August 2012.
<i>Project value (Rs)</i>	5,913,815	5,719,750	5,714,286
<i>Construction time frame:</i>			
<i>Actual start date</i>	12 September 2011	13 September 2012	30 August 2012
<i>Scheduled completion date</i>	mid-February 2012	31 January 2013	01 January 2013
<i>Project documents and date:</i>			
<i>(i) Contract between CS and its contractor</i>	Undated	10 September 2012	18 August 2012
<i>(ii) Agreement between Ministry and CS</i>	26 December 2011	22 October 2012	09 October 2012

*The beneficiary's 30 percent contribution is to cover cost of substructure and block-walling (phase 1). The FSF/Ministry 70 percent contribution is to meet costs of: reinforced concrete beam, trusses, purlins and steel roofing (phase 2), drains, metal barriers and openings (phase 3) and electrical, plumbing, waste management, finishes etc (phase 4). Disbursement for phase 2 depends on completion of phase 1 and on proof that beneficiary has incurred 30 percent of construction costs thereon. Total maximum amount to be disbursed as grant for phases 2 to 4 by FSF/Ministry on each farm is Rs 4 million. While disbursements on the Petit Merlo farm for phases 2 to 4 is in the ratio 25:20:25, for the other two farms it is 30:25:15.
Source: Agreement Ministry/Cooperative Societies and agreements CSs/contractors

FSF payments on model dairy farms

<i>Payment details</i>	<i>Dairy Farm at Petit Merlo</i>		<i>Dairy Farm at Nouvelle Decouverte*</i>		<i>Dairy Farm at Mare D'Albert</i>	
	<i>Amount (Rs)</i>	<i>(date)</i>	<i>Amount (Rs)</i>	<i>(date)</i>	<i>Amount (Rs)</i>	<i>(date)</i>
Electricity Supply	587,315	(Sep 2009)	225,350	(Dec 2009)		
Borehole drilling and release of retention money	753,128	(Jan 2010 – May 2011)				
Construction of new concrete platform			386,849	(Jul 2010 – Nov 2010)		
Supply of fibre glass tank			169,625	(Sep 2010)		
Repair of track road			441,861	(Oct – Dec 2010)		
Plumbing work			14,950	(Dec 2011)		
			237,330	(Dec 2010)		
Release of grant for construction works	4,000,000	(Jan 2012 – Apr 2013)	3,900,000	(Dec 2012 – Jul 2013)	4,000,000	(Oct 2012 – Jul 2013)
	5,340,442		5,375,965		4,000,000	

*Certain works paid for the farm, also, benefitted another existing Cooperative Society at Nouvelle Decouverte, as agreed by the FSF in August 2009.

Source: Food Security Fund