ANIMAL PRODUCTION DIVISION

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1.0 INTRODUCTION

The real success of the livestock sector is to make the most out of scarce resources, seeking ways to produce more food with limited resources. In Mauritius, a set of competitive disadvantages renders it difficult for the prospective farmer to develop a profitable enterprise in the livestock sector, and these are poor genetic potential, poor environment conditions, poor access to good quality feed and fodder, inefficient marketing of livestock products and untrained and amateurish farmers. Livestock production is a function of all these factors. The activities at the Animal Production Division (APD) were geared towards alleviating some of these conditions. Consideration must be given to the setting up of a strategic framework for the development of the livestock sector.

1.1 Towards a Livestock Genetic Improvement Strategy

It is generally recognized that the local livestock genetic resources will underperform in terms of its economic traits. Government has taken steps to enable farmers to import good breeds of cattle, goats and pigs. However, this genetic potential needs to be maintained by a functioning and efficient artificial insemination service for all three species of livestock. In the long-run, continued mass importation of foreign breeds is not economical. A systematic genetic improvement program should be developed for each species. This would consist of regular importation of a few bulls, bucks and boars and the development of the AI service. APD has already begun with the pig AI facility and is continuing its efforts with the goat AI service. In the same vein, the reactivation of the cattle AI service is being considered. Much emphasis is laid on training of farmers to carry out AI by themselves.

Concerning the current situation for the dairy cattle sector, 250 pregnant heifers have been imported whereas for the goat sector no importation of animals has been effected yet. However, the goat AI service is being set up by APD and training of farmers has been planned for 2012. Concerning the pig sector, no importation has been carried out since 2009; however, the AI service is operational using semen from 2nd generation South African boars. A first batch of farmers was trained in 2011 and a second training is planned for 2012.

If the example of the pig sector is taken, where importation has occurred and an AI service set up, the results are self-evident. The sector was virtually on its knees a few years ago with the scourge of the African swine fever. At present, production is so high that prices have plummeted considerably. In the cattle sector, there has been importation but the AI service operated by the veterinary services is not functional. The same analysis can be made for the goat sector where no importation of breeding animals has occurred. Without the initial herd, the AI service runs the risk of being ineffective.

1.2 Towards a National Animal Feed and Fodder Policy

The cattle and goat sector of Mauritius has traditionally used a low-input, low-output system of production. Farmers, usually operating in the backyard, possessed a few head of cattle and goats for which they gathered low quality forages from the vicinity. These animals had low production
rates. However, with the food security crises that the country has gone through and the continued impending threats of food shortage, the Food Security objectives of the Government stipulate that the country should reach at least 10% self-sufficiency by 2015 (20M litres of milk per year). To reach this amount, we would need 5,500 lactating cows in the national dairy herd. The total number of head of cattle should be around 7000, given that 30% of the herd is dry at any given moment. This herd needs to be fed with good-quality fodder, around 40 kg per head daily in order to sustain its productivity.

The same logic needs to be applied to the goat and sheep sector. For goats, we are expected to reach 35% self-sufficiency in 2015, that is, around 90 tonnes (at present we are at 68 tonnes in 2010 down from 77 tonnes in 2009). Currently, our goat herd is at 30,521. One head of goat needs 7 kg of fodder per day.

The following table summarizes the fodder requirement of the different species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Current National Herd</th>
<th>Current demand for fodder (kg/day)</th>
<th>Projected national herd in 2015</th>
<th>Projected demand for fodder (kg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle (Dairy)</td>
<td>4960</td>
<td>198400</td>
<td>7000</td>
<td>280000</td>
</tr>
<tr>
<td>Cattle (Beef)</td>
<td>1658</td>
<td>66320</td>
<td>7000</td>
<td>280000</td>
</tr>
<tr>
<td>Goats</td>
<td>30521</td>
<td>213647</td>
<td>35000</td>
<td>245000</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>478367</td>
<td></td>
<td>805000</td>
</tr>
<tr>
<td>Total in tonnes</td>
<td></td>
<td>478.367</td>
<td></td>
<td>805</td>
</tr>
<tr>
<td>Total per year</td>
<td></td>
<td>174603</td>
<td></td>
<td>293825</td>
</tr>
</tbody>
</table>

At present, 175,000 t of fodder are needed to meet the requirements of cattle and goats. This need is expected to rise to 294,000 t in 2015 in order to achieve our food security objectives. It is a basic tenet in livestock production that good feeds equal good production. Hence, an adequate supply of good-quality feed needs to form an integral part of our food security strategy.

**Imported Feed Resources (Concentrates)**

At present, two companies: LFL and Meaders respectively produce 110,000 t and 65,000 t of feed annually (mainly poultry feed) from imported ingredients. However, the price of raw materials has increased and so has the price of the feed. One tonne of cowfeed now costs Rs 9,450. Concentrates form a major part of the feeding of livestock. For example, recommendations for feeding lactating cows are to provide 2 kg of cow feed for maintenance and 0.5 kg for every litre of milk produced in addition to 40 kg of fodder.

The dependence on imported feed ingredients is a **serious flaw in our food security strategy**. If our objective is to be self-sufficient to a certain degree in livestock products to minimize the effects of international trends, some amount of local production is desirable. Secondly, concentrates are not a replacement of fodder. Hence a strategy to increase local fodder production needs to be formulated.
Avenues for developing local feed resources:

The Sugarcane Industry: It is a fact that we cannot divert land from productive agro-industrial use to fodder production. In other countries, the by-products of agro-industry become the base for livestock production. In Mauritius, the only industry which can fill in these requirements is the sugarcane industry. We must fully investigate the potential of the sugarcane industry to provide cheap sources of fodder. The components of the sugarcane that can be used as fodder are as follows:

(i) Sugarcane tops: an estimated 1 million tons are produced every year. Sugarcane tops have very low nutritive value. Nevertheless it can be used as a fibre base and complemented with concentrates or another protein source for feeding cattle. Hence, investigation into the possibility of collecting and processing sugarcane tops for use by farmers should be investigated.

(ii) Sugarcane straw: Cane straw can become a good fibre base for cattle if baled and processed. The appropriate technology for this is already present but the question is of organizing small cow keepers to make use of such capital intensive systems.

(iii) Canes: There are presently a large number of sugarcane fields that are being abandoned by farmers for logistic and economic reasons. These sugarcane fields can be put to better use for livestock. Here also, it is a question of organization for collection at the site of such cane fields. The law must be amended to legalize use of canes that would otherwise be wasted for fodder.

(iv) Bagasse: lowered availability because of use in energy production

(v) Molasses: The food security policy of Government mentions that a fraction of molasses produced should be reserved for livestock production. Steps must be taken to enforce this policy.

To illustrate the use of sugarcane straw, we can imagine a system where farmers pay sugarcane plantations for the straw they collect. The farmers will have to be equipped with the appropriate technology. This is feasible if farmers are organized into cooperatives.

Direct planting of fodder: An avenue of fodder production is the use of sugarcane interlines. While using interlines for crop production such as groundnut, the byproducts can be used for livestock production. A protocol needs to be devised on a national basis to plant and collect the crops and transfer them to the farm sites. Interlines can also be used for direct plantation of fodder. If done on a sufficient scale, the farmers can have sufficient fodder to last months through silage.

Industrial Products: Some categories of animals can make use of industrial products such as Brewers’ grain and yeast (e.g. beef cattle, goats and pigs). In Mauritius, an inventory of industrial products that can be used as feed needs to be carried out including the quantification of these products.
In order to achieve the food security objectives of Government, it is imperative to develop local feed and fodder resources. In order to achieve a national fodder framework, existing sources of fodder need to be investigated. The following recommendations can be made:

(i) Initiate steps to organize farmers into functional cooperatives with the objective of enabling fodder collection.

(ii) Grants and loans must be provided to cooperatives (and not to individual farmers) for the acquisition of equipment for baling and processing straw; and for processing and mixing feed.

(iii) An agreement to be sought with sugarcane estates for the collection of sugarcane straw and tops at low prices.

(iv) The law to be amended to allow farmers to make use of canes as fodder.

(v) An agreement to be sought with sugarcane estates for the use of sugarcane interlines for fodder production.

(vi) Training to be given to farmers in silage production.

(vii) An inventory of local industrial products that are usable as feed to be made. Their nutritional profile and palatability should be researched.

Furthermore, dairy cattle uses a lot of water, a more sustainable solution seems to be in the direction of recycling waste water into energy, fertilizer and biomass. The present FAO/IAEA Technical Cooperation Project driven by AREU (MAR/5/021-Improving Smallholder Dairy Productivity through Better Nutrition by using Locally Available Forage and Browse Species) should be monitored closely for its outcome to farmers.

1.3 More research and development in livestock marketing

Marketing channels for local livestock products, with the exception of chicken, are poorly defined. Farmers are unaware of market prices most of the time. Often, farmers cannot afford to send their animals to be slaughtered at the Central Abattoir and are at the mercy of market intermediaries. Information on the subject of marketing is scarce. Several questions must be answered before a proper policy can be proposed such as: customer preferences, sales outlets, packaging of the livestock products, quality assurance.

APD has begun a preliminary work to gauge customer preferences in milk consumption. However, a complete study is warranted to understand the complexities of marketing of animal products in Mauritius and to propose a marketing channel that will serve the interests of both the farmers and the customers.

1.4 Upgrading of environmental conditions in which livestock live

Environmental stress is a key factor of productivity in livestock. Good housing and sanitary conditions are prerequisites for a profitable livestock enterprise. Loan facilities are available for farmers who want to upgrade their farms. It is a question of training and extension in order to make the farmers realize the importance of the right environmental conditions for production.

2. MILK MARKETING STUDY

One of the basic tenets in any type of business is the principle of marketing which dictates that activities of a firm (or producer), including planning, operations and policies, should be oriented
towards the consumers. In Mauritius, it is a widely accepted belief that consumer preferences have shifted from fresh milk to powdered milk. Locally produced milk in the fresh form is therefore inconsistent with the preferences of the market. There have been reports where farmers have been unable to sell their milk leading to much wastage and loss.

In the context of food security, the Government is actively encouraging more and more entrepreneurs to get into the business of milk production. On a national scale, it is imperative to devise the appropriate milk marketing strategy that will ensure the sustainability of the sector. The aim of this study is to determine the potential of the Mauritian milk market to absorb the projected increase in local milk production and identify the marketing options that may be adopted to correct the situation, if required.

2.1 Background Information

2.1.1 National Milk Production

*According to the National Livestock Census 2009, the herd of dairy cattle was 4960 males and females of which 1182 were lactating cows. Milk production is set to increase due to significant importations of heifers being undertaken by Government for the private sector.*

2.2 Problem Statement

There is a need to understand the market dynamics of the milk sector. It is particularly important to know whether the market can accommodate this growth and that there really is a demand for locally-produced fresh milk.

2.3 Objectives

(I) To determine the consumer preferences in milk consumption particularly the percentage of fresh milk consumed compared to the total amount of milk and milk products consumed.

(II) To propose market options for a more efficient marketing of milk produced by the smallholders

2.4 Methodology

Since the objective of the study was to gather data on the milk marketing situation, a quantitative survey was devised, and the target population was the consumers of milk products in Mauritius. A sample of 384 consumers of milk products was required, rounded to 400. Since, the consumers were not identifiable as such; they could only be contacted at the site of purchase, that is, supermarkets and other sales points. The *personal interview method* was adopted between officers and customers of supermarkets in both rural and urban regions of the island (north, centre, south, west and east). The following interview sites were chosen: Winners’ Saint Pierre, Winners’ Triolet, Centre Commerciale Jumbo, Phoenix, London Way, Vacoas, Smart, Flacq, Winners’ Bambous and Winners’ Rose Belle. A simple and short questionnaire was prepared with multiple choice or numeric open-ended questions on: Average monthly income, number of persons in family, gender and age of interviewee, type and amount of milk products consumed per month and reasons for not buying local milk. A pilot test was undertaken to ascertain the reliability of the survey questionnaire for the study.
2.4 Results and Discussion

Through the survey, it was hoped to compare the profile of the consumers against essentially three variables: whether they consume fresh milk, type of milk products consumed, and factors which influence the choice of type of milk products.

The average consumption of milk products of urban households amount to 10.8 kg/month while for the rural households it is only 7.25 kg/month. The average for all respondents was 8.59 kg/month. The results showed that urban consumers consume a little above 0.22kg and rural consumers 0.13kg/month of fresh milk per month representing respectively less than 4% and about 2% of their total milk product consumption. The most consumed milk product is imported powdered milk, which is 49% and 57% of the total milk product consumption respectively for urban and rural consumers. The percentage consumption of processed liquid milk and dairy products for the urban consumers is 7% and 40% respectively compared to 3% and 38% respectively for the rural consumers. Four income categories were specified: less than Rs 10000, Rs 10000 to 20000, Rs 20000 to Rs 30000 and more than Rs 30000. It was found that the two lower classes consume significantly less fresh milk than the two upper classes. The consumption of all milk products tends to increase with income. The fresh milk consumption of higher classes is more than the double of that of the lower classes. The price factor seems to be a major consideration in the consumption. One litre of local milk comes to Rs 36 while one litre of reconstituted powdered milk would cost only Rs 12.50. Correspondingly, the price factor does not seem to be important when it comes to consumption of powdered milk as differences between the classes are less pronounced. This may be because powdered milk is the main milk product consumed by Mauritians. The results show that 58.5% of the whole sample was unaware that local milk was being marketed (56% for urban and 60% for rural citizens). Of the people that were aware of the marketing of local milk, 71.5% claimed that local milk was available to them for purchase (70% for urban; 72% for rural). It was found that the cost is a most important factor affecting consumer choice, the second most important factor being the brand of the product. The consumers preferences for the factors affecting choice was as follows; brand 25.8%, country of origin 12.3%, packaging 14.5%, fat content 32.1% and others 12.3%. The preference for low-fat milk products (fresh milk has normally quite high fat content) is far lower than price and quality considerations. The majority of the respondents (49.7%) affirmed that local fresh milk was not available for purchase, 19% did not like the taste while some 11% considered it to be of poor quality.

2.5 Conclusions and Recommendations

This study has established that:

(i) The milk consumption pattern of Mauritians is biased towards imported products with fresh milk consisting of 2-4% of milk consumption.
(ii) Powdered milk has become the main milk product of Mauritians.
(iii) The price factor is an important consideration in milk consumption. Since local milk is more expensive than imported milk, it is at a severe disadvantage.
(iv) Local milk also faces some consumer biases as regards perception of taste and quality.
Given that consumers are unawareness of a local milk product on one hand and imported product is more economical and has become a basic food product on the other hand, the marketing challenge before the dairy farmers of Mauritius seems to be enormous. If the dairy activity is to be successful, there is a need to undertake an exercise of market development. Alternatively, we can encourage the transformation of milk into other value-added products such as cheese, which can find their market locally.

3. SETTING UP OF A GOAT ARTIFICIAL INSEMINATION FACILITY

A SWOT analysis of the goat sector carried out by the Division in 2010 highlighted several weaknesses of the goat sector including a very low growth rate and slaughter weight of our animals indicating a possible genetic deterioration. For the long-term development of the goat sector, the APD began to contemplate the setting up of a goat AI unit.

In September 2011, approval was obtained for the setting up of a caprine AI unit. The model to be adopted is that the Division would import breeding bucks from which semen would be extracted for inseminating the national herd. Initially, the help of the Chinese expert, Mr. Huang Bing will be solicited to undertake and demonstrate the technology of caprine artificial insemination. At a later stage, our own staff and farmers have to be trained in insemination. The AI Unit will be situated adjacent the pig AI unit at Belle Vue ES.

As soon as approval was obtained, APD has solicited the aid of the Engineering Division for drawing up of plans and preparing a list of materials. Purchase of materials was completed in December 2011. Procedures for the import of breeding bucks have already been initiated with the Procurement and Supply Division. The Unit is expected to be operational by September 2012.

4. PIG ARTIFICIAL INSEMINATION UNIT

Following the six-month extension of contract of two Chinese experts (Mr Yan Sheng Quan and Mr Huang Bing) back to Mauritius on 26th March 2011, the following has been achieved:

- In April 2011, the laboratory was set up at Belle-Vue ES, Albion and two young adult boars were trained for collection of semen.

- The objective of the AI station is to produce high quality semen and disseminate it to the farmers. The task of detecting heat in sows and effecting AI is left to the farmer. Since 27 April 2011, a series of meetings were held weekly at Belle-Vue Experimental Station, Albion, with theory, demonstration and on-the-job training. Thereafter, the collaboration of AREU was also sought to bring the farmers from different part of the island to visit the AI facility. Different topics of discussion were covered such as: Advantages and purpose of pig artificial insemination, training of the boar, collection handling and processing of fresh semen, heat detection, time and method of insemination, pregnancy diagnosis, factors for success (nutrition, health, etc), cost of production and revenue calculations and simple recording system.

- In demonstration of semen collection, some 65 pig breeders attended the training sessions while one stockman and one general worker from Animal Production Division have received practical training.
In demonstration of semen processing and dilution, some 65 pig breeders attended the training sessions while one Senior Technical Officer from the Animal Production Division has received training.

After the three-month training period, farmers have become more aware of the A.I. technology and were then asked to call the APD staff for the insemination of their animals on their farm. Some fifty sows have been inseminated at Saint Martin, Goodlands, Albion, Grand Bel-Air, Chemin Grenier, etc. These included two inseminated sows belonging to Belle-Vue ES and which gave birth to 10 and 11 piglets in October 2011.

During the on-call visits, owners of sows were given further explanation on detection of heat and timely insemination. At present, the two Chinese experts are transporting the semen from the AI station and performing the first insemination in the sows themselves. The second bottle of semen is given to the breeder for insemination of their sow twelve hours later.

28 third-year Biotechnology students of the University of Mauritius were given a half-day session on 10 November 2011. The long-term objective is to have trained breeders who will fetch the bottles of semen at the AI center at Albion.

One Technical Assistant has been posted to APD finally on 24/10/11. He is being given trained by the Chinese experts. The next step is to import a few boars in order to infuse new blood in the national herd to prevent inbreeding and to improve the genetic performance of the national herd.

5. POULTRY BREEDING CENTRE
The main objective of the Poultry Breeding Centre is the production of day-old hybrid broilers and layers for sale to poultry farmers. Due to labor shortage at the PBC however, production of hybrid layer chicks has stopped temporarily since April 2011. Production of ducklings for 2011 has gone well beyond the target of 15,000 units.

5.1 Importation of Parent Stock
A total of 5118 broiler Parent Stock Ross 308 (chicks) was imported on three occasions during 2011 from New Zealand. These imported day-old chicks were kept in the quarantine unit at Curepipe before being transferred to Réduit. No disease of quarantine importance was observed from the imported parent stock, and mortality rate was within acceptable range.

5.2 Birds’ Strength
Monthly birds’ strength and parent stock in production are given in the table below. An regular production of day old chicks was achieved by having a well planned importation program of parent stock chicks and a good management of the birds. The Broiler Parent stock was 4150 at December 2011 whereas the layer parent Stock was reduced from 831 in January 2011 to 121 by March 2011 after which all the spent layers were culled.
5.3 Egg Production
A total of 871,547 eggs were produced during the year. Broiler parent stock *Ross 308* gave a total of 828,174 eggs (monthly average of 69,015 eggs) while layer parent stock *Isa Brown* gave a total of 43,373 eggs until the spent layers were culled by March 2011.

5.4 Egg Disposal
A total of 873,380 (including 1,833 brought forward from December 2010) eggs were disposed, 74.4% of which were set while 25.7% were sold as table eggs. 0.07% was broken or discarded.

5.5 Birds’ Performance
Total eggs set were 651,118 (613,063 broilers and 38,055 layers). Total chicks hatched were 511,320 (484,360 broilers and 26,960 layers and cockerels).

5.6 Chicks Production & Disposal
The number of chicks produced by the APD is shown in the table below. A total of 526,310 chicks were disposed of which 486,198 broilers chicks, 19,051 pullets and 7,631 cockerels were sold.

<table>
<thead>
<tr>
<th></th>
<th>Broiler</th>
<th>Layer</th>
<th>Cockerels</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of chicks produced</td>
<td>489,084</td>
<td>17,907</td>
<td>17,798</td>
<td>524,789</td>
</tr>
<tr>
<td>No. B/F 2010</td>
<td>85</td>
<td>1,436</td>
<td></td>
<td>1,521</td>
</tr>
<tr>
<td>Total</td>
<td>489,169</td>
<td>19,343</td>
<td>17,798</td>
<td>526,310</td>
</tr>
</tbody>
</table>

5.7 Duck Project
A total of 73,582 duck eggs were produced at Belle Vue Farm where the duck strength (Pekin duck) was 651 for the month of December 2011. Furthermore, a total of 24,661 ducklings were produced at the PBC of which 23,337 were sold to the public.

5.8 Revenue
A total of 512,880 chicks were sold at PBC yielding Rs 10,304,644. The sale of eggs yielded Rs 740,497. Revenue from culled birds amounted to Rs 817,778. Sale of ducklings, ducks and duck eggs amounted to Rs 849,659. The total revenue was Rs 12,729,032.

6.0 APPROVAL OF PRELIMINARY ENVIRONMENT REPORTS
In view of obtaining approval of their livestock projects from the Ministry of Environment, proponents are required to submit a Preliminary Environmental Report (PER) to be examined by various Government institutions. Twenty PER were examined by the APD in 2011.