

REPORT OF THE DIRECTOR OF AUDIT

PRODUCTION AND DEVELOPMENT OF LIVESTOCK IN GOVERNMENT

POULTRY SECTOR

Ministry of Agro Industry and Food Security

CONTENTS

	Page
ABBREVIATIONS AND ACRONYMS	3
EXECUTIVE SUMMARY	4
CHAPTER ONE – INTRODUCTION	
<u>1.1 Introduction of Performance Audit in Mauritius</u>	7
<u>1.2 What is Performance Audit</u>	7
<u>1.3 Audit Motivation</u>	8
<u>1.4 Audit Objective</u>	9
<u>1.5 Scope of Audit</u>	9
<u>1.6 Methodology</u>	9
CHAPTER TWO – BACKGROUND	
<u>2.1 Objective of the Ministry</u>	10
<u>2.2 Agricultural Services and Statutory Bodies</u>	10
<u>2.3 Overview of the Poultry Sector</u>	13
CHAPTER THREE – POULTRY PRODUCTION AND DEVELOPMENT	
<u>3.1 Animal Production Division and Poultry Breeding Centre</u>	15
<u>3.2 Duck Production</u>	18
<u>3.3 Production of other Poultry Species</u>	20
<u>3.4 Waste Management and Disposal</u>	21
CHAPTER FOUR – CONCLUSIONS AND RECOMMENDATIONS	
<u>4.1 On chick production</u>	24
<u>4.2 On duck and other poultry species</u>	25
<u>4.3 On Waste Management Policy</u>	25
FIGURES	
<u>1 Production and Consumption of Poultry Meat</u>	14
<u>2 Production and Consumption of Eggs</u>	14
<u>3 Production and Sale of Ducklings at Poultry Breeding Centre</u>	19

ABBREVIATIONS AND ACRONYMS

APD	Animal Production Division
AREU	Agricultural Research and Extension Unit
NAO	National Audit Office
PBC	Poultry Breeding Centre
SM	Statistics Mauritius
TAC	Technical Advisory Committee

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. As such food security is 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 poultry sector and includes the activities of the Poultry Breeding Centre (PBC), promotion of other poultry species and waste management policy for the poultry industry.

Key findings

- PBC was set up in 1959 with a view to supplying day old chicks to local breeders at an affordable price and to cutting down import of poultry products. It opened the way for the development of the poultry industry in Mauritius by using modern technology and this subsequently triggered the expansion of the industry on a larger scale by the private sector. The country is self sufficient in eggs since 1967 and poultry meat as from 1999.
- PBC has been making huge losses for the past ten or more years. Deficits recorded during the last four years, 2008 to 2011, totalled Rs 45 million. Operations at PBC are labour intensive; revenue collected from sale of chicks and ducklings, at a subsidised price, do not cover the high cost of salaries which account for 69 percent of total cost of operations.
- The poultry farm and the hatchery are two distinct components in poultry production and should be kept well apart for optimum bio-security. At PBC, however, both these components are found in the same compound.
- The Ministry, through PBC, and with the collaboration of Agricultural Research and Extension Unit (AREU) has been promoting the production and consumption of ducks during the last decade. Members of the public have shown great interest in duck rearing. Production of ducklings at PBC increased significantly to meet increasing demand.
- Opportunities to develop new areas of activity in other poultry species such as guinea fowls and turkeys also, exist. Turkey breeding, by a few farmers, is basically a backyard activity. The country imports some 76 tonnes of frozen and processed turkey meat every year, principally, for the tourism industry.

According to a study conducted by Animal Production Division (APD) on the feasibility of turkey production in Mauritius, most farmers are unprofessional and none of their produce could find the way to hotels and supermarkets, as they were not adequately processed. There is, nonetheless, demand for local turkey meat. Much interest was, also, shown by the farming community for turkey breeding and by hotels for local turkeys if they were supplied in the appropriate form. The main hurdle to growth of this segment is the lack of good quality breeding stock.

- In a report dated July 2007, a Technical Advisory Committee (TAC) set up to assess the impacts of the environmental problems of the poultry industry, recommended among others, a policy on waste management. In January 2008, government took note of the recommendations of the TAC and, also, that a Steering Committee had been set up under the chairmanship of the Ministry to monitor their implementation. No information could be obtained, at the Ministry, on the composition of this committee, its sittings and discussions and progress of implementation, if any.

Conclusions

- PBC pioneered the success of the poultry industry in Mauritius. The objectives set out for it, then, have been more than accomplished.
- The centre has been, and is still, making huge losses. PBC's loss turns at around a minimum of Rs 12 million annually. This is not sustainable, given that financial resources are limited.
- It is expected that duck keeping activities will grow and thus production of day old ducklings will have to be increased significantly in the country. This can be achieved through higher contribution by PBC.
- From the study on turkey production, conducted by APD, there is demand for turkey meat in the tourism industry and in the local population. Turkey production has considerable scope for development.
- More than four years after government approved that the recommendations of the TAC report on Poultry Waste Management be implemented, nothing has been done by the Ministry to accomplish same.

Recommendations

- It is important for the Ministry to ponder over the worthiness of maintaining chick production at PBC and in the process registering massive losses. The Ministry could consider either a complete revamping of PBC with a view to improving its financial health or at least, to keeping its losses to an acceptable level or cessation of poultry chicks production to avoid the large monthly losses.
- For optimum bio-security and bio-safety, PBC farm and its hatchery should be distanced from each other.
- Activities for duckling production should be maintained.
- PBC should help facilitate access to good quality turkey breeding stock so that a greater number of farmers can engage in this activity. This will help to develop the sector and its market.
- Recommendations of the TAC report (2007) that are still relevant today have to be implemented as soon as possible.

CHAPTER ONE

INTRODUCTION

1.1 Introduction of Performance Audit in Mauritius

Performance Auditing is a relatively new concept. This chapter aims at briefly orientating the reader about its history, mandate, scope, and methodological approach.

Performance auditing was adopted and incorporated into Government auditing at the Twelfth International Congress of Supreme Audit Institutions (INCOSAI) held in Australia in 1986.

NAO started to conduct Performance Audit in 2009 following the amendment to the Finance and Audit Act in 2008, giving the Director of Audit the mandate to conduct Performance Audit.

1.2 What is performance auditing?

Most people associate financial auditing with the checking and verification of accounts to ascertain whether they show a true and fair view. The aim of financial auditing is also to ensure compliance with existing regulations and detect errors and fraud. It has a major effect on the information that forms a basis for decision-making, but it provides limited information on the extent to which a Government's programme fulfils its objectives and goals. Financial auditing should therefore be supplemented and complemented by an audit that examines how well public operations have been performed, that is, to what extent they have produced the intended results and effects. This is the function of Performance Auditing. As well, it goes without saying that, Performance Auditing, aims at promoting economy, efficiency, and effectiveness in the management of public resources, has a wider scope and goes further than the physical inspections to verify that money spent according to the accounting books is manifested on site in terms of physical, observable investments.

1.3 Audit Motivation

1.3.1 *The food crisis*

The recent years saw dramatic increases in world food prices, creating a global crisis and causing political, economical and social instability in both poor and developed nations. The main factors causing food price spikes include an increasing demand for a more varied diet across the expanding middle-class populations of emerging economies, erratic food production on account of climate change, restricted food export policy and increased use of crop commodities for production of bio fuels to mitigate high oil prices. These, coupled with falling world-food stockpiles contribute to the worldwide rise in food prices. As the double whammy of high food prices and the global economic slowdown prevails and persists, the lives of many people are made more difficult.

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 per cent 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 in milk, and for less than 1.25 percent in meat, excluding poultry and pork, of our total requirements. Over the short span of 2005 to 2008, our food import bill increased by 80 percent from Rs 15 billion to Rs 27 billion. In 2010, total agricultural and food products imports rose back to the Rs 27 billion mark before plunging by a mild seven percent in 2009 (Rs 25 billion). By end 2011, the total imports of agricultural and food products reached Rs 31 billion. The overall prices of milk and meat products remain high; this trend is expected to be maintained and will rise if prices soar in the coming years.

The issue of food security across the world became prominent in 2008. 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 – natural disasters, market volatility, financial crises – and to boost agricultural productivity so that it contributes to long-term food and nutrition security. In 2008, a *Food Security Fund Strategic Plan 2008 – 2011* was produced which highlighted the actions that should be implemented to increase the country's food self-sufficiency level and reduce its dependency on imports. In the 2008-09 budget, Government provided Rs 1 billion for a Food Security Fund. The overall policy of Government, for the livestock sector, has always been to improve self sufficiency in milk and meat. In spite of the various incentives and support provided since many years to increase local production in these areas, the country continues to be heavily dependent on imports.

It is against this background that NAO decided to carry out a performance audit at the Ministry of Agro-industry and Food Security (the Ministry) to determine whether the Ministry is doing well in the production and development of livestock to ensure food security.

1.4 Audit Objective

This audit seeks to establish whether the services of the Ministry are efficient and effective for livestock production and development to ensure food security.

1.5 Scope of Audit

The NAO examined how far the Ministry is promoting livestock production and development in three sectors – cattle, goats and sheep, poultry and pig – through its various service divisions, agencies and the Food Security Fund. The examination considered particularly the following questions:

- Whether the Ministry has an effective strategy for the production and development of livestock?
- Is the Ministry doing enough to enhance production and development of livestock in each of the three sectors mentioned above?
- Are the Ministry's veterinary services efficient and effective?
- How far are the Ministry's quarantine services satisfactory?

This performance audit relates to the poultry sector. While reviewing the Ministry's activities in this sector NAO focused on whether the Ministry is doing enough to enhance production of poultry, promote production of other poultry species, and has an effective waste management policy for the poultry industry.

1.6 Methodology

The following methodologies were used in conducting this performance audit:

- Review of related Government policies, procedures, guidelines and legislations.
- Semi-structured interviews with senior management and staff members of the Ministry and statutory bodies concerned with the poultry sector.
- Examination of relevant documents and reports available at the Ministry and statutory bodies concerned.
- Researches to understand practices in poultry production and development.
- Site visit.
- Statistical and financial analyses.
- Process familiarisation.

CHAPTER TWO

BACKGROUND

2.1 Objectives of the Ministry

The overall objective of the Ministry for the livestock sector is to increase the local livestock production with a view to improving the food security status of the country through support to local breeders to increase meat and milk production and effective control of animal health. To achieve these goals, the Ministry carries out a number of activities through its Agricultural Services Department, a few statutory bodies and the Food Security Fund (FSF).

2.2 Agricultural Services

This is the largest of the six main departments/units of the Ministry. Its principal activities are:

- To improve meat and milk production locally through advice, technical assistance and through the provision of quality analytical services to the community of small farmers.
- To provide technical advice on farm waste management, integrated farming system, renewable sources of energy.
- To implement Government's policy to protect agricultural land by discouraging its loss to urban development and other non-agricultural uses.
- Ensuring judicious use of available land resources for agriculture.
- To disseminate information through posters and publications of interest to the farming community.

2.2.1 Agricultural Services

The Agricultural Services consist of various divisions that serve both the livestock and food crop sectors. With respect to poultry sector, the following divisions are important:

Agricultural Chemistry Division

This division runs a laboratory, providing analytical support services (chemical analysis) to livestock breeders. Some of its activities are carried out under the Food Technology Laboratory (see below).

Animal Production Division

This division strives to make livestock farming a worthwhile economic activity through the introduction of the best genetics and latest technologies as well as advising and sharing information with all stakeholders concerned with livestock development. The main activities of the division are:

- Operation of the Poultry Breeding Centre (PBC) and Duck Unit where chicks and ducklings are produced, respectively, for sale to the public
- Import of livestock and breed improvement program for farmed animals
- Operation of a poultry quarantine where imported parent stocks for PBC are kept.
- Introducing new technologies
- Initiating new projects with new species for niche markets (e.g. turkey)
- Feed formulation and feed quality control
- Research on new animal feeds
- Livestock policy formulation and technical advice
- Training and advisory services to the farming community.

Food Technology Laboratory

This is a modern laboratory with state of the art equipment. It comprises of three different sections namely the Dairy Chemistry Division, part of the Agricultural Chemistry Division, dealing with food issues and the Microbiology Section of the Animal Health Laboratory which is run by the Division of Veterinary Services. The laboratory strives towards safe and quality foods through excellence in analysis. Its mandate and activities are:

- To ensure the safety and quality of both locally produced, exported and imported food products and to develop new analytical techniques.
- To improve the chemical and microbiological quality of food and food products produced by small cow keepers, micro-entrepreneurs, importers and food manufacturers.
- Microbiological and chemical analysis of foods (pesticide residues, heavy metals, toxins), animal feeds and water for our export and import requirements.
- Provision of technical assistance to all stakeholders regarding food quality and safety.

Land Use Division

The mandate of the division is to provide rational advice on the use of land resources of Mauritius and to safeguard these resources against pressure for non-agricultural purposes. The division is responsible for the management of some 9,170 acres of lands vested onto the Ministry for agricultural developments.

Division of Veterinary Services

This is the national veterinary service for Mauritius. The main activity of the division is the provision of veterinary services which include:

- Treatment of animal diseases through a 24 hour service to the breeding community.
- Laboratory diagnosis of diseases at the Animal Health Laboratory.
- Surveillance and control of diseases/epidemics.
- Sale of vaccines and distribution of drugs to all small livestock breeders.
- Issue of import permits for animal and livestock products.
- Inspection of livestock and livestock products and issue of veterinary permits for export.
- Supervision of manufacturing processes in relation to veterinary products for exports.
- Sterilisation of animal products (e.g. animal hides, peacock feathers etc.) both imported or for export.

2.2.2 Statutory Bodies

There are 22 statutory bodies falling under the aegis of the Ministry. The most important ones for the poultry sector are:

Agricultural Research and Extension Unit (AREU)

AREU has the responsibility to provide training and extension services to all farmers in Mauritius including its outer islands, and to conduct research. The management of AREU is accountable to the Board of FARC.

Food and Agricultural Research Council (FARC)

The objects of the Council are:

- to coordinate, promote and harmonise research activities in agriculture and food production;
- to conduct, through such units as it may set up, research in agriculture and food production; and
- to maximise the benefits of such research.

2.3 Overview of the poultry sector

Mauritius, being a multicultural country, poultry is by far the most popular meat accepted by the whole population. This accounts for poultry dominating the livestock sector.

Initially driven by Government and with continuous improvement brought in by the private sector, the poultry industry has developed very fast and, presently, Mauritius is self-sufficient in poultry and poultry products. During the last 50 years, the country has gained much technical experience and is now a leader in poultry management and production. The island now exports day old chicks to neighbouring African States like the Comoro Islands, Madagascar, Tanzania, Uganda and Kenya, on a regular basis.

The passing decades saw an increasing human population together with an expanding tourist industry that resulted in a soaring demand for chicken meat and eggs. A rise in disposable incomes of consumers and an increasingly health conscious population have, also, contributed to significantly raise this demand. This has led to the poultry sector going through a very rapid development from a part time backyard activity to a more intensive method of rearing.

Presently, the island hosts three types of poultry producers: backyard, medium and commercial farms. Backyard farmers are almost inexistent and their estimated bird population is very low. The medium sized operators are very active either alone or grouped under cooperatives. They operate in good housing conditions and have sound management. Some of them carry poultry breeding on behalf of larger commercial farms. These latter are highly organised, have professional management, use semi-industrial or industrial buildings and cutting-edge technologies for their farming and processing units. They operate vertically integrated units which aim to have processed chicken or eggs as end products starting from imported parent stocks¹.

According to AREU, in 2011, there were 741 poultry farms on the island, of which six were commercial ones. Currently, the island, also, houses six hatcheries, 13 slaughter houses and eight processing plants. As per Statistics Mauritius (SM) figures, the number of birds reared in 2011 totalled some 25 million units and poultry meat and egg productions were of the order of 47,000 tonnes and 186 million units respectively. It is estimated that at any one time there are around four

¹Activities of a vertically integrated unit are: importation (and quarantine) of day old parent stocks, breeding for egg production, production of chicks for fattening and egg laying (part of day old chicks production are sold to other farmers), slaughtering and processing of chicken meat.

million birds that are bred. Figures below show the performance of the sector and consumption in recent years.

Figure 1: Production and consumption of poultry meat

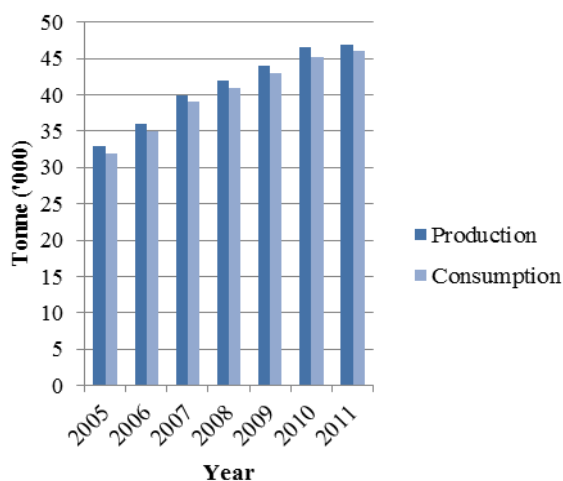
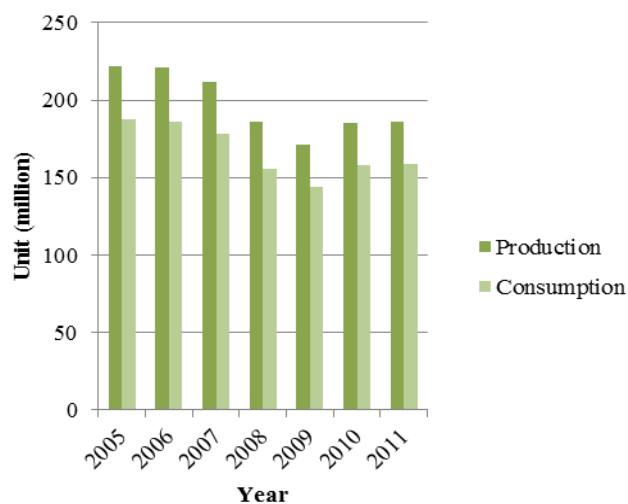


Figure 2: Production and consumption of eggs



Source: Statistics Mauritius

Ducks are, also, raised in small quantities. Since 2002, Government has been promoting the rearing of ducks. Turkeys, guinea fowls and other birds are less popular. In 2008, duck population was estimated at 25,000 heads and one commercial operator produced some 20,000 heads while the remaining 5,000 belonged to small holdings. According to AREU, in 2011, there were 526 small scale farmers producing around 10,000 heads of ducks.

The country achieved self sufficiency in chicken meat since 1999. Limited turkey and turkey products are imported for the festive season and the majority is canalised to hotels. The poultry industry is considered as a success story. Demand for poultry meat and products, which is expected to increase as the years go by, as testified by the above charts, can be met by the present set up with some upgrading. Indeed, the Ministry has assessed that the private sector has the capacity to respond to future increasing demand.²

²Ministry's Strategic Options 2007-2015

CHAPTER THREE

POULTRY PRODUCTION AND DEVELOPMENT

3.1 Animal Production Division (APD)

The Ministry's APD manages two farms, namely the Poultry Breeding Centre at Réduit and the Duck Unit at Albion. Services offered, presently, at APD are registration of small scale poultry farmers and sale of chicks and ducklings to them. Some 425 small scale poultry breeders are supplied with chicks and ducklings, totalling an average of 44,500, every month.

3.1.1 Poultry Breeding Centre (PBC)

Before 1960, poultry keeping consisted mainly in rearing of a few birds of local breed that were fed with some grains, kitchen waste and allowed to forage in the household garden. The production of poultry products – meat and eggs – was low and much had to be imported. The deficiency in supply of poultry products, especially eggs, and the relatively small capital required to set up a poultry unit of reasonable size encouraged more and more people to start poultry farming. *To ensure the smooth and sound expansion of the poultry sector, Government created PBC in 1959 with a view to supplying day old chicks to local breeders at an affordable price and to cutting down the import of poultry products.*

In 1960, PBC produced its first batch of pure breed layer chicks. Following a period of progeny testing, day old layer chicks were first supplied to the public in May 1961. In 1962, layer hybrids were introduced and met with great success due to their better performance and livability. In the same year, PBC extended its activities to broiler chick production and was the first to import parent stock broilers, then. Broiler day old chicks were first supplied to farmers in 1964. In that same year, broiler hybrids were introduced. PBC was not run as a commercial enterprise to compete with poultry keepers. The chief aim was to provide an incentive to the development of the poultry industry through the provision of improved day old chicks, the study and demonstration of modern methods of poultry management.

By the mid sixties, egg production was already well established. The country witnessed a gradual decrease in the importation of eggs from 1.2 million dozens in 1957 to 313,020 dozens in 1966. As from 1967, no eggs have been imported into the country. PBC, also, opened the way for the development of the broiler industry in Mauritius by using modern technology and this subsequently triggered the expansion of the industry on a larger scale by the private sector as from the late sixties. As from 1968, broiler production by the private sector soared with investment in infrastructures and technology, and through an application of the latest skills in poultry farming and management. Day old broiler chicks were supplied to farmers by the private sector as from 1975. The island attained self sufficiency in poultry meat since 1999.

Current operation

PBC still provides day-old chicks to farmers at prices within their reach. PBC clients today are mainly small scale farmers buying between 10 and 2000 chicks at a time. Larger ones procure themselves of their requirements from the private sector. As of April 2012, 425 small scale poultry breeders were registered as PBC clients. Most of these carry poultry rearing on a part time basis to generate additional income that helps to sustain the family unit. Until March 2011, every month, day old broiler and week old layer chicks, totalling about 50,000 units, produced from imported parent stock birds were sold to farmers at the rate of Rs 20 and Rs 26 per unit, respectively. As from April 2011³, production of layer chicks has been temporarily suspended due to a shortage of labour; production is currently for broilers only which turns around 42,000 units monthly. The private sector produces about two million chicks each month and sells day old broiler and layer chicks at a higher price, Rs 23 and Rs 26⁴ each, respectively.

In contrast to the large private poultry farming companies where many functions are fully automated permitting the easy attainment of economies of scale, operations at PBC are mostly labour intensive. Lack of space, also, does not allow expansion of operations to produce more than the annual target of 600,000 chicks. However, with the temporary suspension of production of layer chicks actual production of broiler chicks is around 500,000 units per year. Due to shortage of labour as mentioned above, it is presently not contemplated to increase production of broiler chicks. In fact, PBC is expecting that production of chicks will be reduced in the years ahead if the shortage of labour is not addressed and staff who has proceeded on retirement are not replaced. The activities of the centre are generating huge losses.

Financial results

PBC had been making *monthly* losses for the past 10 or more years⁵. Losses recorded during the last four years, 2008 to 2011, totalled Rs 45 million. This is equivalent to an average annual loss of Rs 11.3 million or a monthly loss of around Rs 940,000. With the temporary suspension in layer production, the loss stands at a monthly average of Rs 800,000. These losses, however, are grossly understated due to the omission of certain items of expenditure such as quarantine costs, motor vehicle running expenses, electricity charges, office expenses and apportionment of overheads, among others. Moreover, because of the adoption of cash based accounting system, depreciation of assets – buildings (office, farm and quarantine station), vehicles and office equipment – and provision for passage benefits to employees are not accounted for.

Had expenses omitted been taken into account, losses reported would have been bigger. It is estimated that current monthly losses of Rs 800,000 would have topped the Rs 1 million mark and those reported in normal periods when layers were, also, produced would have oscillated between Rs 1.2 to Rs 1.3 million. At this stage, it should be mentioned that the statements account for activities related to the sale and production of broiler and layer chicks as well as ducklings. Duckling production and sale are quite recent at PBC (see paragraph 3.2.1 below). Every month

³ The last batch of layers hatched on 5th April 2011. Parent layer stock was depleted and has not been replaced.

⁴ At PBC, the price for a day old layer chick is Rs 23. PBC used to sell mainly one week old layers.

⁵ Our analysis covered the years back to 2000. It is quite possible that losses were recorded in prior years.

about 2,400 ducklings are put on sale at Rs 30 each. As this production is relatively small compared to the 50,000 broilers and layers that used to be produced until March 2011 and the 40,000 broiler chicks under production now, it can reasonably be assumed that the losses reported in the years past are attributable mainly to the production of broilers and layers.

Salary cost and workforce

We have already mentioned that operations at PBC are labour intensive. This is reflected in the huge proportion of salary on total cost of operations. Indeed, salary accounts for about 69 percent of the monthly total expenses. Average monthly salaries paid during 2011 and amounting to Rs 1,201,547 exceeded the average monthly revenue of Rs 1,048,394 collected. This left other costs uncovered that led to great monthly losses. With yearly incremental credit, salary compensation and promotion this average is expected to increase further.

As of April 2012, there were 70 persons employed at PBC. An age analysis of the labour force showed that 49 staff (70 percent) were aged 55 or more years. Six (nine percent) were aged between 50 and 54 years. There remaining 15 staff (21 percent) were aged below 50 years.

Thus, PBC has an ageing personnel and in a few years many of them will be retired. In 2010, the workforce counted 76 staff, and with time some have proceeded on retirement or have been transferred. Very few were replaced. This has led to the shortage of staff and temporary suspension in layer production referred to earlier. An attempt to recruit new staff was not successful. Indeed, in August 2011, seven stockmen were appointed in a temporary capacity but only two chose to work for PBC (the remaining five reverted back to their previous postings).

Bio-security

The farm and the hatchery are two distinct components in poultry production. The farm houses parent stocks that produce eggs. The hatchery holds the incubator⁶ where eggs selected for hatching are 'processed' to produce chicks. Newly hatched chicks can be sold within a few hours (day old) or kept in a brooding section until they are disposed of. The farm, therefore, holds adult birds while the hatchery produces chicks.

As chicks are more vulnerable to diseases they should be kept far away from growing and/or adult birds which may be infected. It is generally accepted that a farm and a hatchery should be several hundreds of metres apart for optimum bio-security. At PBC, however, both these components are found in the same compound, spaced out by dozens of metres only. Thus, bio-security and bio-safety levels are low for the chicks.

⁶ The incubator has two sections: setter and hatcher. Selected eggs are kept for 18 days at the right temperature and humidity in the setter part before being transferred to the hatcher section where chicks are hatched after three days.

3.2 Duck

In Mauritius, ducks are raised in small quantities and in localised pockets. Limited information is available on this segment. In 2006, duck production, excluding backyard, was estimated at 250 tonnes. This production was ensured by private companies. Parent stocks are imported by them and ducklings are produced for fattening purposes. In 2008, duck population was estimated at 25,000 comprising of *Pekin* and *Muscovy* breeds. Eighty percent of the birds (some 20,000 heads) were owned by large commercial operators while the remaining 5,000 heads belonged to small holdings in open space. According to AREU, there were 526 small scale duck farmers in the country, producing some 10,000 ducklings, in 2011.

3.2.1 PBC involvement

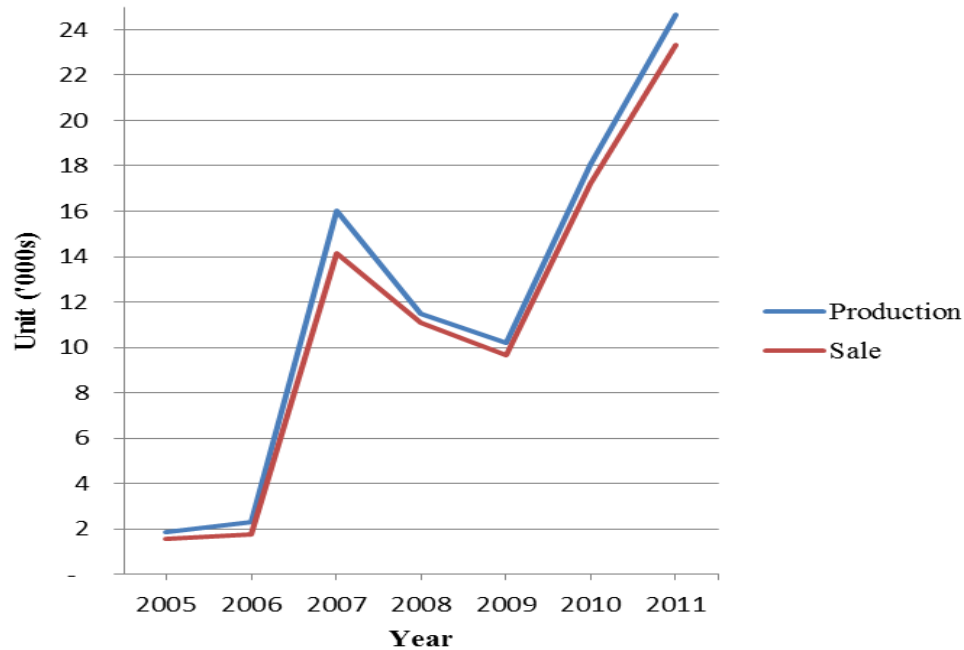
The Ministry has been promoting the production and consumption of ducks during the last decade. Since 2002, PBC extended its activities to the production of ducklings with the help of the Chinese Agricultural Technical Team under the Non Sugar Sector Strategic Plan. A Duck Unit consisting of a farm at Albion, and a hatchery at PBC in Reduit has been created with the following objectives:

- To develop high yielding meat strains through selection and breeding;
- To supply day old ducklings to the farming community;
- To serve as a training centre in duck production and management; and
- To conduct research on duck nutrition.

Fifty ducks of *Pekin* breed were selected from different parts of the island and used as the starting parent stock for the project. The first batch of ducklings (36) was hatched in October 2003 and they were sold to the public in the same month. Over the years, with the promotional campaign, availability of ducklings at PBC and training of farmers in duck production at Albion (with the collaboration of AREU) and at AREU Model Farms and Demonstration Centres where duck units have been set up, members of the public have shown great interest in duck rearing.

Accordingly, PBC took measures to increase capacity of production to give them satisfaction. Flock of parent stock was gradually increased. A new incubator was purchased and made operational in April 2007. At its optimum capacity the incubator can hold 1,100 eggs producing around 700 ducklings in a week, depending on hatchability. With this new facility, production of ducklings increased more than ten folds (see figure 3).

Figure 3: Production and sale of ducklings at PBC from 2005 to 2011



Source: Animal Production Division Annual Reports

As of December 2011, the farm held a flock of 651 birds. As of April 2012, there were around 150 farmers registered with PBC for supply of ducklings and about 600 day old ducklings were available for sale at the rate of Rs 30 per unit every week.

Production and supply of ducklings ran low in 2009 because of breakdown of incubator and of air conditioning system at the duck farm. The breakdown to the incubator persisted during the months of January and February 2010 when production had to be halted. It was reported that the automatic turning mechanism of the setter of the incubator was defective; the setter had (and still needs) to be turned manually. Notwithstanding this handicap, annual production target of 15,000 ducklings in 2010 and 2011 was exceeded. In 2011, 24,601 ducklings were produced, of which 23,337 were sold. This is equivalent to a weekly production and sale of 475 and 450 ducklings respectively.

The above trend augurs well for duck production in the country. According to the Ministry, duck rearing has great economic potential and it is expected that duck keeping activities will grow and assuming a per capita consumption of 0.5 kg per annum by 2015, production will have to be increased to 600 tonnes. To meet this target, production of day old ducklings will have to be increased significantly in the country. This can be achieved through higher contribution by PBC. The latter is known to have successfully catalysed the expansion of the poultry (chicken) industry in Mauritius. It could likewise play an important role in the growth of the duck sector. A shift from chick to duckling production would greatly help in this endeavour.

3.3 Other poultry species

Opportunities to develop new areas of activity in other poultry species such as guinea fowls and turkeys which can develop into exploitable market niches, also, exist.

Guinea fowls are interesting birds to breed compared to other poultry species as they can be kept at a low cost and require minimum labour and management. One private company produces about 75 tonnes of guinea fowl meat annually.

Turkey is a large bird widely domesticated for the table which can be reared virtually anywhere. In Mauritius, turkey breeding, by a few farmers, is basically a backyard activity. Yet, the country imports some 76 tonnes of frozen and processed turkey meat every year, principally, for the tourism industry. Interest by hotels has been shown for local turkeys if they are adequately processed. This is not the case, at present, and local farmers sell their adult birds directly to the public. A market for turkey meat among the local population, therefore, also, exists, but it is underdeveloped. As there is demand for turkey in the tourism industry and in the local population, turkey production has considerable scope for development.

3.3.1 *Turkey production in Mauritius*

In 2010, a study was effected by APD on the feasibility of turkey production in Mauritius. A preliminary survey of the farming community and of the hotels and restaurants was organised so as to determine the interest of farmers in turkey, how the bird is bred and demand for its meat. Results showed that:

- there are 26 turkey farmers all over the island breeding three major types of birds – *Bronze*, *Royal Palm* and *Bourbon Red*;
- turkey breeding is mainly a backyard activity; most of the farmers are unprofessional and none had any specialised and adequate facility;
- the average flock size was two males and eight females;
- produce are sold as live birds to other farmers (who use the birds as breeding stock) or to the public for meat consumption. Being unprocessed, local turkey meat do not find their way to hotels and supermarkets;
- an adult male turkey can be sold for Rs 3,000, an adult female for Rs 2,600 and a poult (young turkey) for reproduction fetches around Rs 500;
- the main hurdle to growth of this segment is the lack of breeding stock. Farmers have to inbreed their birds. Other obstacles are diseases, lack of space, high cost of feeds and inaccessibility to markets;

- 153 farmers expressed their interest to rear turkeys. This represented an initial demand for some 2,200 birds;
- hotels indicated a relatively high consumption of turkeys during the festive season; 22 percent have turkey on their menu all year around. They are supplied with imported frozen and processed turkey, but most of them stated that they would prefer local turkeys if they were adequately processed. Mean consumption per year stood at 82 kg.

From the above, it is clear that turkey farming in Mauritius is in its early years. Consumption in hotels and by a few members of the population shows that there is a demand for turkey meat. Given this activity is essentially a backyard one, supply is limited and prices remain high making the meat inaccessible to, and unaffordable for, many. The interest shown by the farming community for turkey breeding and by hotels for local turkey if supplied in the appropriate form are promising for this sector. Presently, the biggest consumer for turkey meat is the tourism industry. According to SM, tourist arrivals in Mauritius totalled 964,642 in 2011 and are estimated at 980,000 for 2012. With yearly increases in tourist arrivals, demand for turkey should rise and local breeders would greatly benefit by tapping this huge clientele if their produce meets the requirements of hotels.

As it has done for layer and broiler chicken and ducks, PBC could help facilitate access to good quality breeding stock so that a greater number of farmers can engage in this activity. As a start, PBC could collect and breed local turkeys, carry progeny testing and assessment, and produce poults of the breed(s) showing greater potential for sale to interested farmers. Existing farms at Reduit could be used to house parent stocks and the existing incubators utilised. As supply of turkey meat increases, prices should fall and the product would become within the reach and means of a wider segment. As the product becomes known to more and more consumers, this could lead to more demand and supply, thereby, expanding the turkey sector. Depending on the rate of growth of the sector and the exigencies of the market, importation of improved breeds⁷ may become a necessity, professional rearing on a larger scale may be warranted and the establishment of processing plants could be triggered in due course.

3.4 Waste management and disposal

While providing for the increasing demand for poultry meat and other products, the poultry industry has negatively impacted on the environment due to the multiplication of poultry farms and associated activities around the island. Odour, flies and water contamination are the most significant troubles arising mainly from poor husbandry practices and inappropriate waste management. Solid wastes are generated from rearing activities. Their stacking and application in fields causes inconvenience to the neighbourhood and is, also, a potential cause for soil and water contamination and health problems. Wastewater is generated by slaughterhouses. Industrial slaughterhouses operate on site treatment plants, while smaller ones discharge their liquid waste into waterways. The closeness of rearing activity in built up areas represents a high risk of viral propagation in case of an outbreak of the deadly Avian Influenza.

⁷This could be initiated by PBC which already has the necessary experience and logistics in this field.

At the request of the Ministry, the Ministry of Environment set up a Technical Advisory Committee⁸ (TAC), in December 2003, that assessed the impacts of the environmental problems of the industry and recommended a policy on waste management, institutional and legislative frameworks and sifting of the industry towards environmental sustainability. Using the Life Cycle Assessment approach, the TAC gauged the different activities that make the poultry industry – chicken production, rearing, slaughtering and processing – and their environmental impacts. The main findings and recommendations of the TAC, contained in its report dated July 2007, are shown overleaf.

In January 2008, Government took note of the recommendations of the TAC and, also, that a Steering Committee under the chairmanship of the Ministry to monitor their implementation had been set up. However, no information could be obtained, at the Ministry, on the composition of this committee, its sittings and discussions. No progress status reports were available on the implementation of the TAC recommendations, problems encountered and measures taken to address such difficulties. Senior officials at the Ministry showed little awareness of the existence and works of the steering committee.

More than four years after government approved that the recommendations of the TAC report be implemented, nothing has been done by the Ministry to accomplish same. While the Ministry should be praised for requesting the setting up of the TAC, putting the resulting report to dust, for unknown reasons, is not right; the more so, as government placed the Ministry as supervisor for the implementation the TAC recommendations.

⁸The TAC comprised of representatives of Ministries of Public Utilities (Water Resources Unit & Waste Management Authority), Health and Quality of Life, Local Government, Housing and Lands and the above two Ministries. The Mauritius Research Council and AREU were, also, represented. The committee was chaired by an associate professor of the University of Mauritius.

Summary of main findings and recommendations of the TAC report on “Policy on Poultry Industry”

Findings

- Waste water showed high levels of Coliform bacteria⁹; solid waste would contain even more of the bacteria;
- Solid waste in terms of litter and droppings were being reused by the farming community without any treatment;
- Wastewater from slaughtering component of the industry is a major concern in view of its large volume and pollution load. Most waste water is not treated adequately and does not meet the standards for effluent discharge; and
- Institutional frameworks are well established and are adequately mandated to exercise control, but legislations pertaining to poultry rearing are scattered and inadequate.

Recommendations

- Devising a phasing out plan and a relocation strategy for all farms operating within settlement boundaries to safeguard the health of the residents;
- Handling, containing and storing solid and liquid wastes by properly equipped operators to be treated or carted away in licensed waste carriers;
- Composting of farm solid wastes at a regional or central composting plant;
- Solid waste from slaughterhouses to be either rendered for formulation of pig feed or appropriately disposed of while waste water from hatcheries be disposed into septic tanks and soak away system;
- Collection of the blood component in slaughterhouses separately from the normal waste stream and disposal thereof at a landfill or rendering it as pet food;
- Large scale slaughterhouses to have on-site waste water treatment plant while smaller ones to construct a watertight holding tank for wastewater to be carted away to an approved disposal site;
- All slaughterhouses and processing units discharging wastewater into a wastewater system or treated effluent in watercourses to apply for appropriate licenses and permits;
- Amendment of regulations and environmental guidelines, and preparation of health guidelines for the hatchery sector;
- Carry an awareness campaign to inform operators on the recommendations of the TAC; and
- The setting up of a Steering Committee to discuss on the implementation of the TAC recommendations.

⁹These bacteria are, generally, not disease-causing, but their presence in high numbers is an indication that pathogenic organisms that cause diseases can, also, be present.

CHAPTER FOUR

CONCLUSIONS AND RECOMMENDATIONS

4.1 On chick production

PBC pioneered the success of the poultry industry in Mauritius. Its advent allowed the country to produce its own broilers and layers under local conditions and ensured the smooth and sound expansion of the poultry sector. The supply of day old chicks to breeders at an affordable price greatly helped in this move. With an enterprising private sector, the country is today self sufficient in poultry products. The present success of the industry is directly related to Government setting PBC, 52 years ago and the objectives set out for it, then, have been more than accomplished. Unfortunately, for some time, the centre has been, and is still, making huge monthly losses. Our analysis, limited to an accounting plane, showed that, on a commercial basis, PBC's loss revolves between Rs 12 million (when broiler chicks only are produced) and 15 million (when layers are, also, produced) annually. This is not sustainable, given that financial resources are limited.

Presently, the main motive to maintaining chick production at PBC is to be able to supply, some 425 small farmers, breeding stock at a relatively cheaper price – Rs 3 less than what is offered by private firms for a chick. This activity, which presently excludes production of layer chicks, generates huge monthly losses of up to Rs 1 million at the centre. Even if PBC sold its chicks at the same rate as in the private sector, losses would still be recorded.

Therefore, it is important for the Ministry to ponder over the worthiness of maintaining chick production at PBC and in the process registering massive losses, only to sell the produce at Rs 3 less than the commercial price tag. The Ministry could consider the following options:

- *A complete revamping of PBC with a view to improving its financial health or at least, to keeping its losses to an acceptable level. This may imply a restructuration of PBC or a re-invention of the centre as a whole. The Ministry may have to consider reviewing the objective of PBC. The strategies and means (including investment costs) to upgrade the centre will have to be clearly spelt and worked out. Proper cost and benefit analyses will have to be undertaken.*
- *Cessation of poultry chicks (broilers and layers) production to avoid the large monthly losses. The implications, here, are manifold.*
 - First, PBC clients will have to purchase chicks from the private sector to pursue their businesses. That the private sector can supply an additional 50,000 chicks every month need not be questioned. However, prior to ceasing production (if this course is chosen), it would be wise for the Ministry to negotiate with the private sector to secure the supply of broiler and layer chicks – about 50,000 units, monthly – to PBC clients.

- Secondly, chicks will have to be bought at a relatively higher price. To ease the transition, the Ministry could delve into the need to provide financial support to PBC registered breeders to meet the *additional amount* that they will have to disburse. This subsidy could be offered for, say, two months maximum, *based on the number of chicks that the registered breeders used to buy from PBC every month*. It is not contemplated that PBC registered farmers will pull out of business if they have to buy chicks, from the private sector, at three rupees more than what is offered by PBC.

4.2 On duck and other poultry species

Duck and turkey sectors look promising; both have economic potential. PBC is very much involved in duckling production and is encouraged to pursue this course. PBC is, also, well placed to help the turkey sector develop; facilities already available should be helpful in this endeavour. Just as it has been the pioneer of the poultry industry, PBC could similarly play a major role in the growth of these two sectors. Only farms could be kept at Redit and the hatchery transferred to Albion where, presently, the duck farm is located. This will provide the bio-security and bio-safety needed in poultry production.

Activities for duckling production should be maintained. An involvement of PBC in the production of good quality turkey breeding stock should, also, be considered to facilitate the development of this sector.

For optimum bio-security and bio-safety, PBC farm and its hatchery should be distanced from each other.

4.3 On Waste Management Policy

Since government's approval, in January 2008, for the recommendations of the TAC report – "Policy on Poultry Industry" (released in July 2007) – to be implemented, no concrete actions have been taken by the Ministry to execute same.

It is important for the Ministry to revive the Steering Committee so that recommendations of the TAC report that are still relevant today may be implemented.