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*Sustainable Agriculture:
Livestock Management Policies for Minimizing
the Negative Impacts of Stray Livestock in
Grenada, Carriacou, and
Petite Martinique*

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Abstract

Stray livestock and the associated problems are not new or limited to underdeveloped countries. The approaches developed vary from place to place and from time to time, dependent on the particular circumstances. In 2001, Grenada experienced one of the severest dry seasons. This resulted in an intensification of problems associated with stray animals. In Carriacou, in particular, the economic impact of stray livestock is significant, limiting crop production through high costs of fencing and crop damage, degrading the environment, reducing stock number and stock breeding quality, polluting public places and putting at risks vehicular traffic

Current legislation dating back to 1850's has proven to be inadequate as it has not addressed the root causes of stray animals. Some of the causes relate to (i) issues of land tenure including landlessness of livestock farmers and competition between crop and livestock farmers for space (ii) livestock management including overgrazing and overstocking (iii) socio-economic and legal issues including poverty and unemployment. To adequately respond to the negative and costly impact of stray livestock, proposed solutions need to be informed by root causes of the stray livestock problems and should be focused on sustainability. Such solutions would have implications for the Government and Ministry of Agriculture.

The Ministry of Agriculture needs to review its livestock programs, making them more appropriate to the capacity of the livestock farmer. Public awareness and education on the issues surrounding livestock production and the stray livestock problem, would be critical to a process expected to reduce the number of stray animals and the improvement of livestock production in particular. Some concrete recommendations which are policy and management oriented are offered, some or all of which may be taken up in addressing the stray animals problem.

INTRODUCTION

During 2000 and 2001, the Ministry of Agriculture, Lands, Forestry, and Fisheries (MOALFF) and the Ministry of Tourism and Civil Aviation (MOTCA) in Grenada explored ways of addressing the stray livestock problem in the tri-island state. The dry season of 2001, being the driest in the past 16 years, created a shortage of animal fodder forcing landless farmers to release their animals to fend for themselves. The increase in damages to private property and serious vehicular accidents led to, sometimes unfair, criticisms of the Ministry responded by setting up or reactivating a unit to carry out mass impounding of stray livestock. This solution was just a temporary one as the stray livestock problem need to be better analyzed, so that more sustainable solutions could be suggested and implemented.

The problems to the community posed by stray livestock, although widely observed and discussed at varying levels of community, have not been previously analyzed. The problem is more critical in Carriacou where there is a tradition of a "leggo beast season" which coincided with the dry season from mid-February to June or July whenever the first rains of the rainy came. This leggo beast season, up to the 1970s allowed for extended freedom for sheep and goats but never for cattle and donkeys. The larger livestock were released only during the daylight periods and were collected during the afternoon for daily watering and penned during the night.

Clearly, there are linkages between the causes of stray livestock and the risks

created. All too often attempts are made to control the threats from stray livestock without addressing the real root causes.

REVIEW OF THE PROBLEM

Stray animals and the problems associated with stray animals are not unique to Grenada nor is it a modern societal development. In Ireland in the mid-nineteen century, Ethna Carbery (1845) described the effects of the stray animals' problem in a poem with the line "their fields are now the stranger's where the stranger's cattle stray". Stray animals range from the abandoned dogs of large cities, wild horses of New Zealand, feral cats of Australia to the roaming cattle of Indian cities.

The magnitude of the problem of stray animals is reflected in papers and articles. MacFarlane (1997) described how stray animals were overrunning American cities and called for greater owner education. Capham and Johnson (2000) described how stray animal problems were handled by the police through public awareness and education. Business enterprises have developed around stray animals, for example animal shelters, animal halfway houses, private pounds and animal rights and welfare institutions.

Solutions to the problem of stray livestock range from pounding to extermination. The Canadian Province of Saskatchewan has a complex stray animals Act (revised four times between 1978 and 1998) catering for both private and public pounds. In other cases, penalties for stray animals include realistic fines to disposal by public auction. In the case of Canada,

governments provide communal pastures, which are often used simultaneously like pounds. In many countries, designated pound keepers are appointed while in other cases the police is empowered to seize (D'Souza, 2000).

The call for poisoning as a solution has been made in many influential quarters (Parrott (1999) and Wimmer (2000)). The sustainability of these enterprises is hinged on the anticipated increases in the number and types of stray animals.

In St. Vincent and the Grenadines, stray livestock created risks to safe aviation traffic during the 1990s forcing the Government to use draconian measures of shooting on site some of these stray livestock. The result was reported to be satisfactory. In Trinidad, stray livestock caused many serious accidents on the highway linking Port of Spain to San Fernando.

The approaches proposed and implemented for dealing with these problems must be informed by the root causes of this chronic practice of letting livestock loose for limited periods during the year as obtained in Grenada or continuously as done in Carriacou. In Grenada, stray livestock and the associated problems are influenced by land tenure, livestock management, and socio-economic and legal issues.

CAUSES OF STRAY LIVESTOCK IN GRENADA

Stray livestock that are of concern to the society include cattle, goats and sheep. Very few livestock owners are full-time livestock farmers. In fact, the owners of sheep, goats and cattle rear these animals to supplement their main income from other sources. The

progression of the severity of the problem in some cases could be associated with institutional deterioration, while, in other cases, the absence of adequate agricultural sectoral policies and support services can be identified as the main causative factors. These can be grouped accordingly as (a) land tenure, (b) livestock management, (c) socio-cultural, and (d) legal.

Land Tenure Issues

Based on the 1995 agricultural census, 11%, 13% and 12 % of cattle, sheep and goats are owned by landless farmers while 35%, 48% and 46% of cattle, sheep and goats are reared by persons having less than half an acre of land. In Carriacou, the figures are much higher. In the South of the main Island, most owners of livestock, particularly cattle, own no land and have limited access to lands. In many cases they use state lands e.g. Mt. Hartman, and unfenced private lands where grass/fodder is available. Over time, these farmers are motivated to increase their stock since there appears to be no penalty for trespassing on state lands or private lands.

Where landless farmers rent or lease lands for the purpose of rearing animals, other farmers who do not invest in securing such lands compete on these leased or rented lands for the limited fodder. Such situations then encourage the well-intended farmers to quit the lease or rent arrangement and join the band of "free ranchers".

In the south of Grenada, the reduction of suitable lands for livestock production has escalated due to the rapid rate of development in the tourism sector. Prior to the construction of the international airport

and other tourism infrastructure in areas including Point Salines, Calliste, Mt. Hartman, True Blue, Grand Anse Valley and Lance Aux Pines, the south was exclusively utilized for livestock farming. In the past 25 to 30 years, the land use has changed from livestock farming to tourism, housing, industry and communication. Unfortunately, alternative locations were not developed for livestock. Attempts to squeeze more and more out of a given piece of land translate into destruction of the environment.

Consequently, the competition for these southern lands between livestock farming and other uses resulted in the continuation of a farming tradition that is out of line with developmental trends. This highlights the need to have an institutionalized Land Use Plan or a National Land Policy

Livestock Management Issues

Livestock management by the MOALFF and by individual farmers has deteriorated at least in the past 15 years. An apparent lack of clear policies for the development of livestock and in particular for cattle, sheep and goats has facilitated this decline. Government's investment in agriculture in general and in the livestock sub-sector specifically, experienced declines in the recent past (Figures 1 and 2). Except for the refurbishment of the Veterinary and Livestock administrative office in 1996 and the preparation of the relocation of the Mt. Hartman Farm to Laura during 1999 and 2001, Government's capital expenditure in the livestock sector averaged 2% of the recurrent expenditure in the past 10 years. Private investment in livestock, excluding poultry which has had a seesaw path, has

also declined. Government's livestock infrastructure at Mt. Hartman, Mirabeau Agricultural Station, Mirabeau Agricultural Training School in Grenada and Dumfries and Belair and Limlair in Carriacou are in very poor conditions or in complete abandonment. Recently, the Laura Station has been set up as a replacement for the Mt. Hartman Station but operations there are far from satisfactory. Since the collapse of the Grenada Revolution, the government's intervention as it relates to improved stock, the quality of livestock extension services and other indirect support of the sub-sector has virtually disappeared.

In the past, livestock farmers with limited land collected and stored fodder for the dry season. This was a typical practice in the South, North and Carriacou. Fodder was obtained from sugarcane waste, corn stalks and corn straw, peas and beans straws and from selected grasses. This practice was lost with the reduction of the production of sugarcane and the above-identified food crops. Unavailability of fodder during the dry season leads farmers to let their animals loose to fend for themselves, with disastrous effects on vehicular traffic and damages to property owners.

The absence of good management of the livestock sub-sector at the government level and at the individual farm has led to overstocking and over-grazing in some cases. Overgrazing and overstocking of livestock lead to environmental degradation. The fall of many civilizations including the Sardis of Western Turkey and the Bodouin Negev Desert (Olson, 1981), have been associated with land degradation due to overgrazing and/or overstocking. In modern

times, in one area in Tanzania erosion became so acute that all ruminant livestock were removed for up to 10 years to facilitate recovery (Ogle, 1990). Kaimovitz (1992) reported that in Central America watersheds are seriously threatened by soil degradation from extensively grazing livestock. Evidence of similar land degradation can be observed in La Pelle and Petite Carenage in Carriacou and on the island of Petite Martinique.

The livestock (cattle, donkeys sheep and goats) population in Carriacou is approximately 7200, an equivalent of 2444 Tropical cattle unit (TUC) estimated using methodology in Pagot (1992). Most of these can be classified as stray at some time of the year. Assuming all the current agricultural lands were used by livestock, the stocking rate of 0.3 ha/TUC for maintenance is 17.6% of the required stocking rate of 1.7 ha/TUC for a rainfall regime of 1000 mm/year (Pagot 1992). Annual precipitation in Carriacou is 1000 mm. This represents a conservative over-stocking by the magnitude of 6 times.

Local farmers have long recognized that land space is limited in small island developing states (SIDS). To optimize the available lands, previous generations developed ingenious forms of integrated agriculture. A cattle owner during the 1960s used his animals for cash, for producing pen manure and for milk. The latter activities necessitated having control of the animal most of the time. The farmer was therefore forced to keep his animal poled or tethered. As the demand for pen manure is generally satisfied from poultry and most of the milk consumed locally is imported, the motivation

for continuing these practices has been eroded.

One important element of good livestock management is farmer education. Traditional livestock farmers rarely consider what is an adequate number of animals to keep. Communities need to understand the cyclic effect of stray animals on socio-economic development; possible damages and loss of life on highways, loss of life and serious injuries to tourists and other hotel guests. The costs of such incidents need to be transferred or linked directly to livestock farmers.

Socio-economic Issues

A comparison of the importance of livestock to the farmer today and 30 years ago would be quite revealing. The livestock farmer is a part-time farmer who if he was in the South, might be a construction worker, a bus driver or a hotel employee with a fixed wage. The livestock then supplements the income but in an unplanned way

A new culture in which independence and freedom of expression are demonstrated instead of disregard for law and order. This general social malaise can be seen in the farming community where individuals practice "we do as we please", unconcerned about how we impact the lives of others. The loss of strong community values, where a member's success was the village's success, has impacted on the negativity of stray animals in the community. The greater opportunities for employment outside of the farming community, the apparent reduced emphasis on agriculture in general and livestock production in particular

also influence the community's response to the problem of stray livestock.

In some cases, poverty and unemployment may be linked to the escalation of the stray livestock problem. Lack of employment and the subsequent lack of purchasing power force individuals and families to stretch their limited resources. When this resource is livestock without lands, stray animals may result. If freeing up 4 cows and 10 sheep would ensure ham and drinks for Christmas, or playing in the mass band for carnival, then it is unlikely that the garden of a hotel would receive much sympathy from such individuals. When individuals are struggling to raise money to purchase food for the family, unreasonable behaviours can be anticipated.

Legal Issues

There are a number of laws and regulations that can be utilized in dealing with stray livestock. Many of these laws satisfied the colonial era and the plantation system prior to the 1970s. Although these laws are on the books, the supporting institutions no longer exist or have become ineffective due to lack of resources. Whereas, for example, forest rangers actively impounded animals found on the side of roads, on government premises and on crown lands, this no longer takes place since the function and focus of the forest ranger has changed without a replacement for the prior functions and responsibility. The environment in which many of these laws were introduced has been radically transformed.

To support the impounding of animals, government livestock farms were designed to house these livestock until the owners

could claim them. The fees involved could cover the costs of maintaining the animals in custody and were a disincentive to livestock owners to having animals on the loose.

COSTS OF STRAY LIVESTOCK TO THE SOCIETY

The main costs in avoiding stray animals in Grenada and particular in Carriacou are related to (a) fencing for keeping the animals out, (b) losses from uncontrolled grazing, (c) damages to fenced property, (d) losses in the transport sector through vehicular accidents, (e) land degradation, and (f) pollution in public places and losses in farmer earnings.

- i. The cost of fencing one acre of land if the farmer does not include cost for his labour is approximately \$7785.00. Considering that he obtains the initial capital for fencing at 12% interest, the life of the fence is 10 years and annual maintenance of the fence is 5% of the initial investment, then the annual cost of having one acre fenced is \$1989.85. With a total agricultural area of 1776 acres (Agricultural census, 1995) the total costs for fencing could reach \$3.5million per year.
- ii. Two kinds of costs are involved in assessment of the economic impact of land degradation. The first is the income foregone as the result of prior land degradation. The second is the cost of controlling and repairing land damage (Dregne, et. al. 1992). In Australia the annual costs of land degradation is \$2 billion (Scarsbrick 1995) while global costs of preventative and rehabilitation measures range between \$10 and \$24

- billion (UNEP estimates). The initial costs of repairing the damage when degradation is not severe could involve simple technologies of grass and stone barriers and would amount to \$2550.00/acre and \$3950/acre respectively. Where land degradation is severe, like at Petite Carenage and Belview in Carriacou, the repair costs could be 20% to 30% more and require a longer recovery time. No estimates are available for losses in cases of mild degradation but in cases where degradation is severe, subsistence households can forego incomes of around \$2400.00 annually from lost crops of corn, peas and beans. Other environmental costs associated with land degradation are associated with lowering of the levels in dug wells and high sedimentation in small dams and ponds. Ponds and small dams in Carriacou are cleaned at 5 year intervals in the 1990s and 2000s as compared to 8 to 10 year intervals in the 1950s and 1960s.
- iii. Costs associated with *losses in the transport sector* are from two main sources. First there are losses from vehicular accidents. In addition, in Carriacou there are costs at the Lauriston airport due to animals straying onto the runway area during takeoffs and landings. In the case of landings, arriving aircrafts have to circle the Lauriston and Hillsborough to enable staff to remove the animals. In the case of departing aircrafts, flights are delayed.
 - iv. On the main island, pollution by stray livestock is significant in the tourist area of Grand Anse. Cattle in particular stray onto hotel compounds and unto beaches where their deposited waste, besides being a nuisance, creates additional costs to hotel owners for cleaning. In Carriacou, stray livestock use public places not occupied during the evenings and nights for shelter. Schools in Carriacou are particularly vulnerable. Schools are forced to undertake additional cleaning at the beginning of every school day.
 - v. Incidence of crop damage from stray livestock in Carriacou are referred to the Ministry of Agriculture by way of requests for compensation estimates. Best records are available for 1999 when 189 cases of crop damage by cattle, at a cost of \$28200.00 were reported. The total damage is much higher as settlements are made in some cases without the intervention of the Ministry while in many cases the livestock owner cannot be identified.
 - vi. Annual livestock losses in Carriacou directly associated with roaming animals are significant and can be as high as \$50,000.00 for cattle alone. During the past 10 years there has been an average of 24 cases of malicious wounding of cattle with five to six deaths (12 in 1998 or 1% of total stock) when animals stray unto private property (McIntosh, 2002). In addition, during the dry season annual losses of cattle that are stuck in ponds and water holes and are unable to free themselves average about 7, or $\frac{3}{4}$ %, of cattle population (in 1999 the figure was 28). In most cases

the carcasses are left to decompose as the owners of this livestock are reluctant to claim them from fear of being held liable for prior damages of their animals.

This creates a public health hazard

- vii. Uncontrolled livestock as is observed in Carriacou in particular poses a risk to overall livestock health. If a livestock disease is identified in the livestock population, control mechanisms require isolation and sometimes eradication of the sick animal. In the case of Carriacou such controls would be difficult. Further, timely identification of diseased animals can be hampered. Recently, the international crisis of foot and mouth disease made Carriacou a great risk since there is high flow of Carriacouans between the UK and Carriacou. The potential costs from any livestock outbreak in Carriacou are high under the current stray-animals condition that exists.
- viii. There is an old saying that "your children and your animals put you in trouble with the neighbour". In Carriacou, in particular, stray livestock has created many village conflicts between livestock owners and subsistence crop farmers. The costs, albeit more qualitative than quantitative, is real. These conflicts increase during the growing season. Fear of planting at the beginning of the rainy season, damages to young plantlets, loss of whole crops result in family feuds culminating in verbal and physical abuses require settlement at the court. The cost incurred through legal fees and medical fees among others is psychologically expensive. The

resulting inability of communities to be cohesive is a cost to community development.

RESPONDING TO THE PROBLEM

The solutions for dealing with the stray livestock problem cannot be singular, since there are multiple causes. The solutions should address the causes singularly or in combination. The following are some of the possible solutions:

Policy Framework

In developing countries there are advantages in central government having the responsibility for developing and implementing a national livestock development plan (Williamson and Payne, 1980). The different aspects of the solution to the stray livestock problem, from legislative to incentives, must be dealt with in the context of a national livestock framework

Laws dealing with stray animals are well-developed in countries where there has been a history of competition between livestock production and crop production. These laws are a collection of statutes enacted over a period to regulate the ownership and control of various forms of livestock. The laws are developed either on the philosophy of owners having the responsibility to keep out animals or to fence animals. In the USA virtually all the states have similar livestock laws that address stray livestock.

In Grenada, the problems of stray animals and legislation to address these problems date back to 1849. This Trespass Act dealt with the recovery of damages by

horses, mules, asses, cattle, sheep, goats and pigs. Since then, this Act has been amended in 1958, 1973, 1974, 1990 and 2000. Recently, the law relating to stray animals was amended, making it possible to shoot stray animals. These amendments (Laws of Grenada, 2000, Act 29) and the Stock Trespass Act, CAP 312 give the power to a victim to impound a stray animal or kill same where attempts to pound are futile. In the case of impoundment, the fees have been revised although not necessarily reflecting the true costs of implementation.

The amendments made in the past appear to have been hurriedly executed, to address specific problems in an ad hoc manner and were not informed by an examination of the root causes for the stray animals. Consequently, there is still room for a more comprehensive legislative review that would seek some level of consultation with key stakeholders.

Stray animal laws may stand alone or be included in wider livestock laws. These laws must address the legal rights and duties of the parties when stray animals are captured by someone other than the owner. What happens if the owner cannot be found? What are the liabilities of the owner of a stray animal when that animal is responsible for the death of an individual? What happens if a stray animal is killed by a vehicle on a roadway? What happens if animals die whilst impounded by Government? In addition clear guidelines should be developed to guide both owner and victim in the cases where there are damages involving stray livestock.

Livestock Management

One route to addressing the stray animals problem would be to develop adequate livestock management systems. The Government, through the Ministry of Agriculture Livestock and Veterinary Division, would need to take the lead role. This must be supported by clear policies and guidelines that are sustainable. Adequate livestock management would include a number of elements that should work in harmony with each other in addressing the current inadequacies.

Feed lots and curling: If livestock feed is available during critical periods at an affordable price for the farmer he is more likely to comply with laws requiring control of animals at all times. The experiences in Carriacou and Petite Martinique prior to the 1980s show that appropriate conservation of excess fodder from during the rainy season could be used in developing adequate stocks. The production of hay on state lands at Dumfries, Limplair and Bel Air, plus government-leased lands, may be explored during the rainy season. This could be done by individual farmers, larger landowners, and/or government.

Communal pastures may be supplemented with livestock feed and concentrates which are bought through bulk sourcing which would minimize costs to the farmer.

The overstocking and overgrazing in Carriacou suggest that a programme of curling is required, particularly at the onset of the dry season. As fodder is much more abundant on the mainland, Government or a private sector interest can facilitate the

process by establishing feed lots where the animals can be kept. Curled animals would be purchased from the farmer and kept for a short period before slaughter. There are opportunities for these feed lots on a number of government estates that are under-utilized or on idle private estates.

Zero grazing production: A Zero Grazing form of production requires limited land space. However, zero grazing requires the construction of pens, acquisition of transportation and increased labour outlay. For such production to be cost-effective the livestock must be highly-productive-egg, milk, goats, or dairy cattle. This solution, therefore, would have limited applicability.

There is one great advantage of Zero Grazing that would enhance the country's move towards organic farming. Large scale organic farming as anticipated in the future would require large quantities of organic manure. It would, therefore, be prudent to incorporate Zero Grazing as a component of an organic farming system.

Zoning of lands for agricultural production: Many problems faced in agricultural development could be linked to the lack of clearly stated policy on the use of land as one of Grenada's main resources. Over the years, farmers have developed best practices for use of lands for example nutmegs are best grown in the high elevated areas, livestock has developed in the north and south of the mainland and Carriacou.

However, the nature of land tenure by which landowners can essentially develop lands at will have led to development not often informed by fundamental criteria on

land use. Livestock production in highly developed centers intrinsically poses problems for property owners and business. There are restrictions on the rearing of pigs in certain locations. Similarly, there could be restrictions on other animals. This would require a legislative review in addition to clearly defined policy on land use including development by zoning.

Marketing: The local market accepts a variety of animal types with no set bench mark for quality. Nevertheless, local consumers, particularly those involved in the tourism industry, are beginning to demand improved quality of meats. In most tropical countries there is a tendency for trading in cattle at the end of the season of good grass growth (the rainy season) or at the beginning of the dry season (Pagot, 1992). A similar practice is possible in Grenada but particularly in Carriacou where current sale during the height of the dry season creates reduced income to the farmer. To accommodate this approach, infrastructural improvement in abattoir and cold storage facilities is required. Although detailed plans and sources of funding for new and up-to-date abattoir facilities were available at the MOALFF, internal politics prevented the establishment of these important livestock facilities. If these facilities are put in place, then there could be two time slots for slaughtering livestock from Carriacou, October to November which would satisfy the high meat demands of the Christmas period and mid-January to February (beginning of the dry season) to satisfy the peak of the tourist season.

Rationalizing the Appropriate Roles of Different Agencies

The current approach of impounding animals is necessary but insufficient. A shock treatment of shoot-on-sight could also be carried out. This however, should not be the responsibility of the Ministry as such actions would be in conflict with the whole purpose of the Ministry. The Ministry of Agriculture cannot or should not be seen as an agent bringing hardships on the farmer, when in fact its primary role is to facilitate the farmer. Impounding and destroying should be placed with another agency better-equipped for such activities e.g. the Police.

Public Awareness and Farmer Education

Lack of awareness of the wider public about the costs to individuals in particular and the economy in general would detract from Government's efforts to tackle the stray animal problem. The existing rights of owners and victims of stray animals although on the legal books are not widely known. These situations could be corrected by developing a public awareness program which would look at the major issues relating to stray animals and discussed and publicized. Public awareness could be achieved on radio, television, bill boards etc. This awareness would be geared at helping to change attitudes associated with freeing of animals, need to save fodder etc.

CONCLUSIONS AND RECOMMENDATIONS

Stray livestock problems are worldwide and the methods applied in dealing with them are wide-ranging. In most countries, the

responsibility lies with the police while in other cases Ministries of Agriculture, Local government and county councils take the lead role. In Grenada, the main responsibility is with the MOALFF. An understanding of the root causes for stray animals is important in designing solutions to address the problems posed by stray livestock in rural or urban communities.

Unlike many clear procedures for handling stray animals have been developed in Grenada, but the responsibility for handling stray livestock is fuzzy.

During the nineteenth century, the socio-economic and legal environment discouraged the prevalence of stray livestock. In the last 35 years, socio-economic and developmental changes, in conjunction with land use and agricultural production system changes, have witnessed an increase in the number of stray livestock with the current legal framework being unable to provide adequate corrective responses.

It is a country where there are conflicts between the systems of livestock and crop production on one hand and socio-economic development on the other hand. Clear overall Government policies in agriculture with special emphasis on livestock in Carriacou would set the stage for reducing and possibly eliminating the stray livestock problem. Such policies would require the involvement of the many stake-holders to ensure broad acceptance of the strategies that might be developed. Some recommendations are suggested below.

Finally, this document dealt exclusively with stray livestock. The problems of other stray animals, particularly stray dogs as they

are a source of health and nuisance problems, and their relationship to the destruction of controlled livestock (sheep and goats) should not be overlooked.

Policy

- Government should commission a review of the current local legislation and, that of other Commonwealth countries facing problems with stray animals. An outcome of such a review would be clear procedural guidelines on handling stray animals including impoundment
- As a short term solution, the fee structure for damages due to stray animals need to be reviewed making it representative of all the costs involved in settling damages and losses due to stray animals.
- In the case of enforcement of legislation and regulations the Ministry of Agriculture is not well- equipped to respond. A comprehensive review of the material and personnel constraints experienced by the Vet and Livestock Division should be undertaken by the Ministry of Agriculture.
- There should be a Livestock Policy developed that is realistically informed by the history of livestock development, the current situation and the long-term objectives of the agricultural sector
- To adequately address development in a limited land space where the competition of land by different sub-sectors is ever increasing, Government must, with some urgency, develop a Land Policy. This Policy must be widely-consulted upon, to ensure that there is wide support for it.

- The Ministry of Agriculture, in collaboration with Tourism, the Police and Government Information should develop a public awareness and education program that table the issues surrounding stray animals.
- Government would need to procure through acquisition or otherwise, 10 to 20-acre lots that would be suited to grass and other fodder and could be developed into communal pastures.

Management

- The Ministry of Agriculture and the Vet and Livestock Division should develop a project or include in its programme a mechanism that would lead to hay-making that would supplement animal feed during the dry season. In addition a broader mechanism for the provision of affordable fodder to farmers should be developed.
- The Ministry of Agriculture, through the Veterinary and Livestock Division should develop a management mechanism for the curling of animals.
- The Ministry of Agriculture would design a program for livestock extension officers to engage land-less farmers. This would facilitate proper intensive livestock production.
- All large livestock should be tagged for identification and ownership
- Zero Grazing should be promoted as an integral part of the planned organic farming system.

Figure 1

Comparison of Investment in agriculture vs total investment

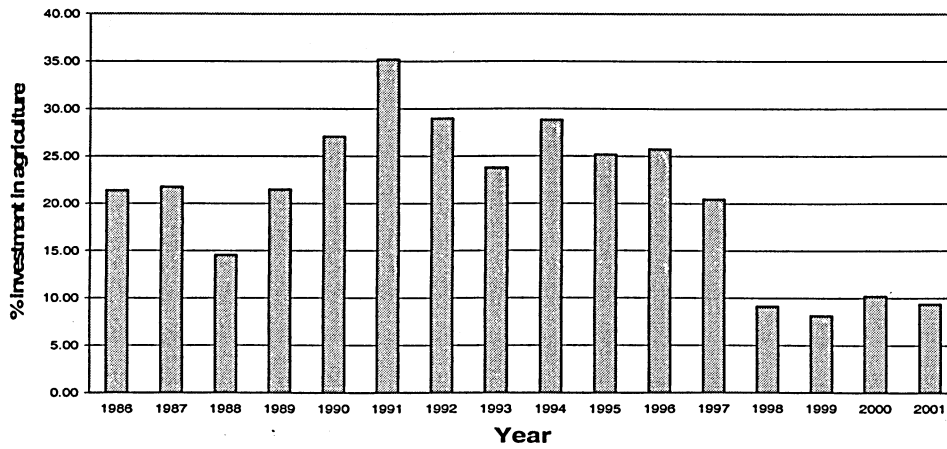
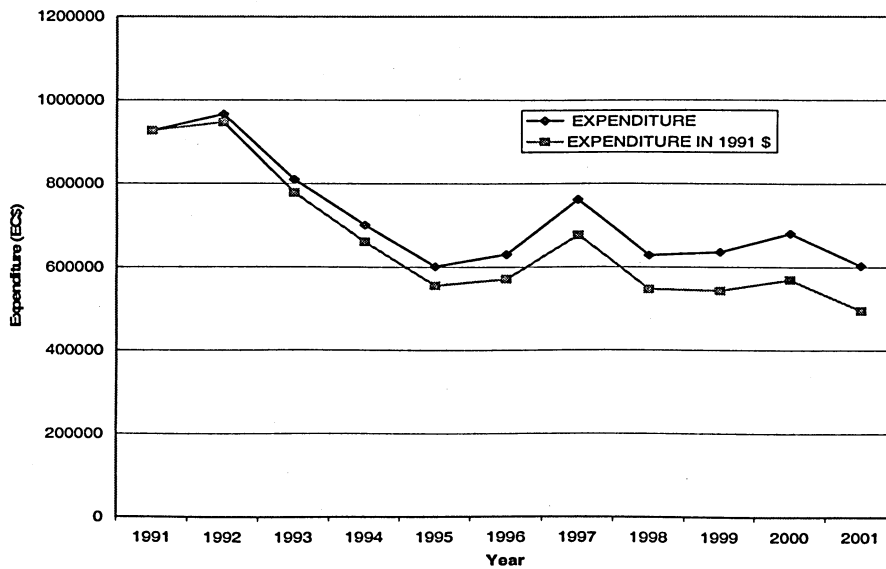


Figure 2

Government annual expenditure in the livestock sector



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