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Jamaica Agricultural Development Foundation

MINAG

IICA

PROCEEDINGS OF THE

SUSTAINABLE SMALL FARM MILK PRODUCTION DAIRY DEVELOPMENT WORKSHOP

Jamaica Conference Centre
Kingston, Jamaica
October 1, 1993

The Jamaica Agricultural Development Foundation
The Ministry of Agriculture
The Inter-American Institute for Cooperation on Agriculture

IICA OFFICE IN JAMAICA

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PREFACE

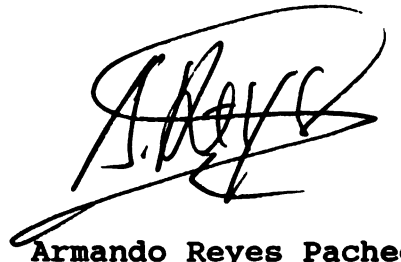
The promotion of Small Farm Milk Production for Sustainable Development based on the St. Stanislaus Collge Farm Model for Small Farmers in the Caribbean countries was initiated by the Agricultural Institute of Canada and the Inter-American Institute for Cooperation on Agriculture. The model was developed in Guyana from 1984 and embodies simple feeding and management practices which have proven to be very profitable for small and medium sized farm family units.

A workshop was held at the Jamaica Conference Centre on Friday, October 1, 1993 at which over 80 persons attended. From September 28 - 30 field visits were held with several farmers and a number of organizations supported and contributed generously to the participation of the farmers.

These institutions include:

The Ministry of Agriculture
The Jamaica Agricultural Development Foundation
The Jamaica Livestock Association
The Agricultural Development Corporation
Alcan Jamaica Company
Serge Island Dairies Ltd.
Nestle Jamaica Ltd.
Rhymesfield Dairy Cooperative
Luana Dairy Cooperative

The IICA office in Jamaica is pleased to have been part of this endeavour.



Armando Reyes Pacheco
Representative

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SUSTAINABLE SMALL FARM MILK PRODUCTION
DAIRY DEVELOPMENT WORKSHOP

Jamaica Conference Centre
October 1, 1993

8:00	**Registration**	
9:00	Opening Remarks	Dr Armando Reyes, IICA Mrs. Cecile Jarrett JADF
	Main Address	Hon. Rodger Clarke Minister of State, MINAG
9:30	Dairy development in the host country	Dr. Carl Wellington Alcan Jamaica
10:00	Sustainable milk production --Large vs. small and medium size milk production systems. Constraints and limiting factors	Dr. Deep Ford University of Vermont
	--Nutritional or health Factors related with small milk production systems	Dr. Alexander
	--The St. Stanislaus Dairy Model approach	Dr. Hector Munoz IICA/Suriname Guyana
	Discussion with Participants	
	Closing Remarks	Dr. D. Ford
1:30	LUNCH	

DAIRY DEVELOPMENT IN JAMAICA

K.E. WELLINGTON - ALCAN JAMAICA COMPANY

AND

J.S. HENDRICKS - AGRICULTURAL DEVELOPMENT CORPORATION

INTRODUCTION

A question that is frequently asked is - "DO WE NEED A DAIRY INDUSTRY IN JAMAICA"?

The response to this should provide a turning point in our deliberations, because if we do not, then our efforts and energies should be directed elsewhere. However, if it is considered prudent to develop a Dairy Industry, then we would submit that it is time for us to realise the implications of the independence which we earned in 1962, and take control of the industry to produce more copious supplies of milk and reduce the reliance upon imports.

It is fashionable to look at constraints and roadblocks. We have a flair for looking backward and assigning blame. We exhort you today to look back at the monuments of success, to view the challenges that there are, and to grasp the opportunities to meet the demands of a future which is ours to build.

Paper presented at Small Farm Milk Production Workshop - Jamaica Conference Centre - 1/10/93

When Columbus visited Jamaica and took the island for Spain in 1494, he found no cattle here. The Spanish colonists brought their cattle which reproduced to develop the various strains of Creole cattle that populated the country when the British arrived in 1655. The British brought with them the cattle of their native lands and when these animals, their descendants and crosses with the Creole failed to be productive, Zebu animals were introduced.

Initially, cattle were reared for the production of hides and manure as well as for their ability to work. Later, meat became an important consideration. It was much later, and indeed not until the latter part of the nineteenth century, that milk production from dairy cows gained some importance. This occurred as a result of the development of centres of population which were later to become towns. Farmers saw opportunity to produce milk for sale to the urban population and so some small dairy farms developed in and around the urban centres. Of course for many years farmers were known to be milking their own cows and for selling milk to their neighbours. These animals were milked on varying degrees of frequency as was dictated by need. There are some indications of cows being milked once per week.

The modern era of dairy farming in Jamaica began with the establishment of the Hope Farm in 1910. Among the objectives in establishing the Hope Farm were:

1. Production of milk for Government institutions in Kingston and Spanish Town

2. Providing seedstock and Sire service for dairy farmers

3. Providing information on animal husbandry for the fledgling dairy industry

4. Training of farmers and Agricultural Extension Officers

The work at Hope has made an indelible mark upon dairying in Jamaica and indeed upon the whole Tropical World as it was from this beginning that breeds were evaluated, crossbreeding work done and the Jamaica Hope breed developed. The physical location for the work was shifted to Bodles in 1950, and the development work continued.

From the outset, small farmers were involved in the genetic programme and they also benefitted from the pasture and husbandry work that was initiated by the Government of Jamaica at that time. The work of Government was taken to other focal points such as Oxford, Caenwood, Orange River, Irwin, Grove Place, Goshen, Rhymesbury and Montpelier. In addition, Sire Service was provided through sale and loan of bulls, Livestock Improvement Centres, subsidized sires and artificial Insemination. Sale of females from the Government's nucleus herd was minimal, but farmers benefitted from the distribution of animals through a revolving herd scheme.

Not only did the Farm School provide opportunities for farmer training, but the Jamaica Agricultural Society initially provided Extension Officers and this service was later taken over by the Department/Ministry of Agriculture. To the small farmers of Jamaica, the names of the Livestock Field Officers and their early contribution are indelible.

The pioneering work done with dairy cattle and pastures in Jamaica has been well recognized worldwide. It bears repeating however, that it was a joint effort between collaborating farmers and Government Technicians that gave these results.

As milk production spread over a wider area of the country, marketing concerns arose and Nestles were invited to establish a milk processing plant with a network of routes for milk

collection in 1940. The condensery which is located at Bog Walk, later established cooling stations at Montpelier and Mandeville, but these are no longer operative. Fluid milk processors came on stream later, and currently eight of these processors handle the bulk of milk that is produced with the remainder going to the condensery.

Several schemes aimed at facilitating dairy development have been tried. These have had varying degrees of success. The Farm Development Scheme resulted in significant acreage being put in improved grasses; the dairy heifer rearing programme was hailed a success and the dairy development programme has seen some 96 farmers settled on medium size farms at Rhymesbury, Vernamfield, Cabbage Valley, Bogue Spring and Luana. The catalytic role that was played by the Agricultural Development Corporation is worth noting.

While this development was progressing, the service agents put in place facilities for providing the various inputs to satisfy the farmers' needs and in addition to this, the Jamaica Livestock Association assumed a representational role for the industry. During this time too, a number of cooperatives were formed and large dairy farmers embarked in a formal way to set up outreach programmes to assist small farmer involvement in development of a tradition for dairy farming.

In all of this, the dairy cow has been the animal of choice. There has however been some effort at dairy goat farming. The work has waxed and waned, and today there is little tangible impact of the effort.

The work done with respect to dairy farming in Jamaica, has exposed Jamaica's potential for dairy development. That potential however has remained largely untapped for a number of reasons. Accordingly, despite several enabling programmes, the industry has shown little response over the last 2 - 3 decades.

The level of milk production is estimated to be about 25% of minimum demand. Milk sold to fluid milk processors and evaluated as "A" Grade forms the most reliable measure of milk production. Some details are set out in Table 1.

TABLE 1

Grade "A" Milk Production - Million Litres

1988	23.9
1989	24.9
1990	27.2
1991	24.4
1992	29.0

SOURCES: Jamaica Commodity Trading Company Ltd. and Nestle - JMP Jamaica Limited

Given our population of 2.4 million and an expected annual increase of 1.1 per cent per year, our current demand for fresh milk is in the region of 180 million litres increasing to 202 million litres by the year 2000. Total milk production is estimated at 45.6 million litres, and of this, milk entering the formal trade is estimated to be 30 million litres.

This disparity in supply and demand has produced a substantial market in the dairy import trade. The deficit in fluid milk production has been met by importation of skimmed milk powder and butter oil which over the last five years have averaged 11,300 and 2,700 metric tons per year respectively. This represents a potential market of approximately J$600 million

and compares with farm gate earnings from Grade "A" milk of approximately J$220 million.

With current international agreements for the reduction of subsidies, world prices of skimmed milk powder and butter oil are expected to increase significantly. This creates a major opportunity for expansion of the local dairy industry.

DAIRY CATTLE POPULATION:

The dairy cattle population has shown a drastic fall in recent years. The 1990 livestock census revealed a total of 22,385 animals distributed among 753 farmers. Some 81% of the farmers own 7% of the animals, each farmer having herds of less than 10 animals. By contrast 72.5 per cent of the dairy animals were maintained on farms of over 200 animals, these comprising only 3% of the farms.

Details are in Table 2.

TABLE 2

Number of Dairy Cattle and Farmers by Herd Size

Herd Size	1-9	10-29	30-49	50-99	100-199	200+	Total
Animals	1588	1123	630	1799	1045	16220	22385
Farmers	613	66	17	26	8	23	753

From the 1990 census, it is estimated that the current size of the breeding population of dairy cattle is approximately 12,000 heads. Assuming that there is no importation and that there is indeed a focus on dairy development, it is estimated that within ten years, the current cow herd could grow to over 30,000 heads producing close to 80 million litres milk per year. This level of increase would be spectacular, considering our performance

against targets since independence in 1962 but would still result in our being a substantial importer of dairy products.

THE FUTURE

The National Agricultural Production Plan for 1990 - 1994 specifically targets the dairy industry for priority attention in Government's drive for increased national food security.

Government's Policy for the industry revolves around:-

1. Trade and price support policy
2. Technical support

Given the pressures on Government's budgets in recent years, there have been severe reduction in support schemes, and the industry must therefore develop its own strategy for survival.

In a liberalized trade environment, given less of Government intervention in industry and commerce, the dairy industry will need to look inward for the resolution of the numerous constraints to its development. The considerable potential which exists for market growth and development will only be realized through initiatives taken by the industry itself.

We are fortunate in Jamaica to have had the years of development effort spearheaded by the Public Sector. The weaning process has began, and it is our firm belief that this will be an irreversible process. The downgrading of public sector research and development, removal of subsidies and privatisation of the Veterinary Service, have impacted heavily upon small scale dairy farmers. Escalation in costs have resulted from these and other factors. The need therefore is highlighted for greater efficiency in our operations. Workshops such as this, and other methods of training will provide a crucial ingredient for the

improvements required to make operations more efficient.

We are convinced and would like to submit that the future for dairy production in Jamaica is a bright one. We feel the need for the greater discipline required in developing a tradition for dairy farming. Among the challenges in finding the way forward are:

i) The development of more models similar to those demonstrated at Rhymesbury, Serge Island, Wallens and Goshen

ii) The development and application of technologies which will contain the rate of increase in production cost

iii) Increasing reliance on inputs that are produced locally

iv) Cooperation, caring and sharing while not losing focus upon the business in which we are engaged

Some of the hardships that we encounter at present will undoubtedly lead us to address these factors in a serious and meaningful manner.

CARIBBEAN SMALL FARM MILK PRODUCTION - JAMAICA

J.R. Deep Ford

Small farm milk production has long been an important agricultural activity in rural Jamaica. After recent visits to Serge Island, Goshen, Rhymesbury, Luana and Cabbage Valley, among other places, it is clear that this tradition is not only alive and well but also growing. It is growing partly because of the support this sector is receiving from such institutions as Nestle's, Alcan, IICA and the Jamaica Agricultural Development Foundation. My remarks are intended to do two things. Firstly, to set the context for the small/medium farmers approach to milk production presented in the film "Sustainable Small Farm Milk Production" to be shown shortly and secondly, to identify some of the constraints to small farm milk production in Jamaica.

The $ and Sense of Small Farm Milk Production

The milk production approach that we are presenting addresses three essential criteria that should define development efforts generally. These are considerations related to efficiency, sustainability and equity.

From an efficiency standpoint, the question is not, "are you making money in dairying", it is "are you making as much money in dairying as you can". Are inputs being combined most efficiently?

1/ Remarks presented at a workshop on Caribbean Small Farm Milk Production in Jamaica, October, 1993.

Are input output coefficients optimal? Is the pricing and marketing strategy most effective? The approach seeks to achieve economic efficiency, maximizing the returns to resource utilization.

From a sustainability standpoint, the question is not, "how to ensure that the production system is stable while you are earning an income **now**?", it is "how to ensure that the production system is stable and that future income earning capacity is protected? Is the production process that you are using destroying the very resources that support it? Are you introducing into the environment elements that lead to its degradation? The approach seeks to ensure that over the long run resources are available for production and for earning an adequate income.

From an equity standpoint, the question is not, "are people making money?", it is, "how many people are making money, is the greatest benefit being achieved for the greatest number?". How concentrated is the industry? What are the access requirements? The approach seeks a model that contributes to increasing the welfare of the broadest cross section of persons, both from a production and consumption standpoint. Thus, access to employment opportunities as well as quality product at affordable prices.

Given the above criteria a small/medium farm milk production model was derived as an alternative to two milk production systems that characterize dairying in the Caribbean. Of the two main systems in place, there is firstly, the very small part-time

producer who milks less than five cows by hand, feeds purchased concentrates and grazes animals along the sides of the road. While this system provides supplementary income for these households it continues to be under constant pressure from municipal regulatory bodies because of violations related to land, traffic, and health regulations. Secondly, there is the large-scale system based on the industrialized country model. This system is characterized by imported breeds (most often Holstein), fed imported feed and milked in modern 8 cow simultaneous milking parlors. It is a highly capital and management intensive system, very import input dependant and only minimally integrated into the domestic community and economy. The alternative system briefly described below and presented in the video addresses the shortcomings of both of the above two systems. It is efficient, it moves farmers from being part time producers to earning a living from dairying, it is accessible because of its low capital and management requirements, it is national resource based and is protective of natural resources.

Small/Medium Farm Milk Production System

The system is designed to increase the productivity of farmers milking between ten and twenty cows. It is characterized by a pasture based feeding system and two relatively simple mechanical technology introductions. The main characteristics of the system can be described in terms of its pasture system, its milking operation and its management practices.

Pasture System

A major limiting constraint to small farm milk production in the Caribbean is the availability of adequate pastures. By introducing improved pastures and an efficient pasture management system the number of acres per animal is reduced. The improved grasses, based on trials in the Caribbean, Central and South America, are generally fast growing (recovering) and can be grazed six weeks after planting. These good qualities compensate for their often only relatively "fair" digestibility.

The pasture fields on the farms are separated into paddocks of a size which facilitate one days grazing and allows approximately four weeks for regrowth. An important technological introduction which made this grazing system possible was the accompanying low cost fencing system. A single thin strand of wire powered by a solar electric unit is introduced. This works effectively in restricting the cows to a specific area daily. This pasture system is the heart of the model and farmers are encouraged to produce and manage grass as a crop. Generally, a supplement of approximately four pounds of local by-product feeds (rice bran and molasses, copra meal, brewers grain) are provided to the animals.

Milking System

Milk production remains a part time activity for farmers partly because of the labour requirements, particularly as associated with the actual milking of the cows. In order to address this constraint a simple small portable milking machine has been

successfully introduced. The sturdily built machines (Cerezo) come in several models - with one or two teat clusters, with gasoline or electric motors, with polyester, aluminum or stainless steel milk pails. The one teat cluster unit can milk 10-12 cows per hour while the two teat unit model can milk 25 to 30 cows per hour. These units are low cost, even for traditional small farmers, and have been adopted and are performing well in Caribbean countries. The use of the milking machines has led to cows now being milked twice per day and thereby capturing the gains from the improved feeding conditions. Traditional cross-bred cattle are maintained as the base of the herds.

Management System

The pasture system and the milking system are promoted as tools of an overall management system. Farmers are trained in planting and maintaining the improved grass under a variety of conditions. The fencing and milking units were chosen for their relatively simple maintenance requirements and are transferred as a part of the management system. In addition to managing the technical introductions farmers are trained in basic herd health, fertility monitoring and lactation management. Record keeping and analysis of both animal and economic performance has been stressed. Livestock extensionists have been introduced to the total package and assist farmers in its adoption.

Relevance to Jamaica

After speaking with dairy sector technicians, visiting more than ninety farmers in five different dairy farming areas and completing twenty-five milk production questionnaires in detail, it is possible to conclude that the constraints to milk production that the above model addresses are very present among Jamaica's small farm (generally less that ten milking cows and less than ten acres of land) milk producers.

Feed Constraints: Farmers are feeding between four and sixteen pounds of concentrate per cow per day and producing an average of 1.6 gallons of milk per cow per day. The gains from increased use of concentrate were marginal and not economical. The increased milk production not covering the increased cost of the concentrate. Small and medium sized farms generally did not plant pasture and did not feed local leguminous plants that are available in the environment. Where pasture was planted there was little knowledge regarding its management, particularly with regard to the most efficient time to feed for maximum nutrient utilization.

Equipment: More than 80 percent of the farmers milking cows milked by hand. In some cases, more than ten cows. There was generally no infrastructure in place for housing, fencing or milking, preparing or storing feed.

Records: No farmer we visited kept more than milk output records. No herd management information was recorded (individual milk production records, reproduction records). There were no estimates of total cost of production, no input/output comparisons,

no profitability analysis, either within the milk system or the farming system.

Farmer organization: Farmers are extremely reliant on external suppliers of inputs and processors of their output. Alcan, Nestle's and Serge Island dairies provide important services at subsidized rates. Farmers should be moving toward the creation of institutions/organizations which guarantee their continued existence if the services of one of these support institutions were withdrawn.

Land Availability/Access to Credit: Many farmers indicated that land was available but they could not gain access to it because they could not obtain credit. Credit programmes that are available to farmers to purchase animals and other inputs are primarily tied to land as collateral. The age old circle of no land because of no credit and no credit because of no land is very present.

Challenges

The global economic environment is changing rapidly in two essential dimensions that are important to milk production in the Caribbean. Firstly, international trade is being liberalized simultaneously that more regional economic blocks are being formed. GATT, NAFTA and the EEC have all placed in jeopardy the continuance of trading privileges received by Caribbean states. The "banana war" which continues as Central American producers demand increased access to European markets, and the reduction in the US sugar quota

in the 1980's are two examples of the increased uncertainly of Caribbean export markets. As foreign exchange becomes scarcer and more expensive import substitutes such as milk will become more competitive. Preliminary analysis comparing price levels at the farm gate with import milk prices suggest that small dairy farms can be competitive in the supply of milk. This domestic dairy sector can supply some of the 75% of Jamaica dairy product consumption that is now imported.

A second dimension of the international framework also favours increased milk production through the system described above. The concern for the environment and the promotion of sustainable development requires that there be more ecologically based production systems and that resources be used more efficiently. This is an important shift from large-scale mechanical approaches and chemically intensive alternatives that dominated development efforts over the past decades. Natural resources are being valued more accurately and cost of production estimates for natural resource intensive activities will undoubtedly increase. This will necessarily lead to a revision of the conventional wisdom regarding the distribution of comparative advantages across some agricultural production activities.

Milk production in the tropics was undermined by international trade policy in the 1960's and 1970's. Milk powder from Europe that undersold local producers is perhaps the best know dimension of this. In the future, more attention has to be paid to agricultural policy in general and to trade and pricing policy in

particular. Together with a policy focus, technology development and farmer organization strengthening must be stressed.

The need for foreign exchange, the need for greater food self reliance, the need to spread development across large segments of society, the need for more balanced and sustainable development, particularly sustainable forms of earning income and sustainable production practices dictate that the milk production sector receive more attention in future Caribbean agricultural development.

HERD HEALTH FOR SUSTAINABLE MILK PRODUCTION
FCM Alexander - M.S. MRCVS

CASE STUDY

Your best cow in the herd is pregnant. Halfway through a dry period of 60 days she is given a full dose of laevamisole. She is steamed up with increased concentrate and good forage during the last 2 weeks as her body score condition increases from 3.25 to 3.5. She gives birth to a healthy calf. The birth process is undisturbed and complete within an hour. The afterbirth is shed within 3 hours. The calf suckles vigorously for 3 days and her milk clears by the 5th day as she joins other cows in the milking herd.

The breast is free from tenderness and she lets down easily, twice per day, producing an increasing quantity of quality milk by the fifth or sixth week. She continues to hold her lactation peak as she is on an increasing level of nutrition even though her body score is reduced to 3.0. She is observed in heat on day 42 but is not bred. On her second observed heat on day 64, she is artificially inseminated. She becomes pregnant and completes her lactation in 305 days when she is again dried off with a body score of 3.0. One month before her calving date she is given a full therapeutic dose of laevamisole. Her steaming up process is repeated. Her body score remains at 3.0 and when expected to calve she is found one morning with the placenta and two forelegs showing but she cannot pass the calf.

Help is received and someone puts a hand into the birth canal, pushes the legs back, straightens the head and with a little help a dead calf is delivered. It takes 4 more days before the afterbirth is fully released. She begins to smell a bit behind and passes a foetid brown discharge.

Intra-uterine pessaries are inserted and the foetid discharge changes to yellow then whitish before it goes away in 3 weeks. The beestings or colustrum is drawn off twice per day but by the fifth day the right front quarter gets red, hard, painful and the secretion is full of shreds and looks watery.

After 5 days of treatment with intra-mammary antibiotic ointment, the milk from the affected breast re-appears normal. She is milked twice per day but produces half the quantity of milk given previously. Her body score is 2.5. she is not observed on heat until day 90 after calving.

After 5 repeat breedings she holds on her sixth service as her body score improves to 3.0. After one more month she no longer gives milk but she is dried off to wait 6 months before the next calf is due.

HERD HEALTH FOR SUSTAINABLE MILK PRODUCTION

FCM Alexander - M.S. MRCVS

Dairy husbandry must be concerned with maximizing production for profit without jeopardizing animal welfare. Herd health management is based on ensuring the economic success of the dairy enterprise. Milk production is severely affected by sickness and ill health. Therefore, disease control is very important and if the animal gets sick, a speedy return to healthy production must be the basis for treatment. However, there are other factors which are equally very serious as they impact on costly losses to the producer.

Milk production is dependent upon a number of factors but the most important is **fertility**. Fertility is dependent upon a healthy normal reproductive tract and function sustained by adequate nutrition -IMPREGNATION should depend upon genetically superior bulls either by natural service or best by Artificial INSEMINATION conducted under optimal cool conditions.

Cows not producing milk and not getting in calf when they should are very costly to the dairy farmer. Yet lost revenue is often unappreciated.

A fertility control programme is usually recommended and is the most cost effective programme for the dairy farmer. The cow described in the Case Study should have been examined 3 to 4 weeks after calving and treated appropriately for her infection or Metritis. The Mastitis problem would also have been recorded on her individual (cow) card and the breast would have been checked. It is usual to allow the uterus full recovery time after Metritis and breeding would have been advised around day 90 after calving. Conception would be effected after 1 to 3 services. A high plane of nutrition during early lactation is essential as the animal will be in negative energy balance and her body score is expected to reduce.

Maintaining a body score at least between 2.5 and 3.0 is best for ensuring conception.

Conception failure should be detected as early as possible. This is best done by a Veterinarian performing a rectal examination before the second missed heat, e.g. between day 32 and 40. A reason for conception failure may be determined and treated or the next heat predicted for successful breeding with the least lost time.

In order to reduce the costly effects of conception failure, post partum and post service anoestrus, animals should be examined and classified and then selected animals, re-examined at specified times.

Heat detection is the producer's greatest responsibility. Often in large commercial herds only 50% of all heats are observed - 75% when heat detection aids are used and 30% of animals presented for insemination are usually not in heat.

- Observation time must be set aside each day for heat detection and when the cows are not engaged in any stressful behaviour.

  2 heat detection times/day - 65% of cows seen
  4 " " " - 95% of cows seen

- Implementation of heat detection devices are very useful - Kamar heat detection or using special chalk or paint markings on the tail.

- Planning for timed breeding can be considered.

- It is recommended that every 3 weeks, a list is drawn up for cows to be specially observed for heat. The percentage of animals seen is a good indication of the effciency of heat detection on the farm.

- Important goals must be set for optimal breeding performance.

Days open - average 85-100 days post partum
Days in milk to first breeding - 40-60 days
Services per conception 1.5

Body scoring is very important and measured usually on a scale between 1 - 5.
Over-conditioning and under-conditioning must be avoided.
The following range is recommended:

Prior to dry-off - 60-100 days	-	3.0 - 3.25
At dry off	-	3.5 - 3.75
At calving cows	-	3.5 - 3.75
heifers	-	3.0 - 3.25
21 - 35 days post partum	-	>2.5
80 - 100 days post partum	-	2.5 - 2.75
100 - 120 days post partum	-	2.75 - 3.0
Heifers - at breeding	-	3.0

(body weight 600-750 lbs at puberty)

Calf Management

The health of the calf begins with colustrum within the first hour and 6% of body weight in milk intake within 6 hours of birth.

Clinical disease of calves and case fatality is dependent on the level of infection in the environment and the level of colostral immunity present in the calf before it becomes ill.

Feeding of fermented colustrum up to 3 weeks of age provides lactoglobulin and reduces neo-natal diarrhoea.

Other important considerations for raising healthy calves are associated with

Development anomalies:-

Trauma and injury including predation by dogs
Navel ill - septicaemia, pneumonia, joint ill
Neo-natal diarrhoea - predisposed by irregular, improper feeding
Early parasitic diseases, e.g. coccidiosis.

Animal husbandry must include careful consideration of predisposing factors to prevent these conditions.

Calf Vaccinations

Here in Jamaica, vaccinations against blackleg should take place between 3 and 6 months of age.

Internal parasite control constitutes a constant challenge in Jamaica.

Losses can be considerable in young animals, resulting in stunted growth, rapid emaciation and death. Fortunately, cattle show increased resistance to internal parasites with age, but high levels of infestation may seriously affect performance especially of heifers and young cows.

Strategies to control level of infestation are dependent upon age of animals, worm species involved, knowledge of their life cycles and predisposing conditions for their transmission, available treatments. Parasites are transmitted through eggs and larvae which are shed in faeces. Warm, moist conditions are required for rapid development into infective stages. Hot dry conditions are unfavourable for survival of infective larvae. Wet, poorly drained pastures provide favourable conditions for internal parasitism. Pastures should be classified into clean, safe or contaminated.

Anthelmintics are most effectively used when treatments are timed so as to prevent the contamination of an animal's environment with infective stages of parasites. The best and most cost effective anthelmintic treatment is prophylactic in nature and is best given to seemingly healthy animals.

Appropriate deworming schedules are useful but guard against complacency. Monitor rainfall and pasture conditions. Anticipate

problems and treat early. Repeat treatments with one dewormer may predispose to build up of certain other parasites.

Improper dosage, inadequate mixing, wrong use can also lead to anthelmintic resistance.

Cattle are generally dosed less than horses, sheep and goats where resistance especially to the Benzimidazoles have been recorded frequently. Rotation of anthelmintics at no less than 6 month intervals is advocated to prevent resistance as well as to prevent a build-up of certain species. There is usually a choice within the following groups:

1. Piperazine/Phenothiazine
2. Benzimidazoles e.g. Albendazole (Valbazen)
   Fenbendazole (Panacur)
   Thiabendazole (Omnizole)

3. Laevamisole/Pyrantel
   (Nilverm, Laevet) (Strongid T.)
4. Ivermectin (Ivermec)

Recommendation - Ivermectin - April to September
- Benzimidazoles or Laevamisole/Pyrantel - October to March

Cows and calves grazing together or calves following cows into pastures are useful strategies to prevent heavy infestations in the young animals.

External parasites

Ectoparasites of importance include flies, lice, screwworm and ticks. All wounds on animals must be routinely treated to prevent infestation or to kill screwworms. Two species of cattle tick are common, Boophilus annulatus (the Tropical Cattle Tick) and Amblyomma cayennensis (the Silver Tick). Acaracide applications are utilized for tick control. Amitraz (Triatrix or Tak-Tic) is effective as a spray or wash, as are the Organo-phosphates, Asuntol and Bercotox. Supona is also available. The Pour-on Flumethrin (Bayticol) when available, should encourage tick eradication measures. Tick-free cattle remain in splendid condition and enhance milk production. Tick infestation causes severe deleterious effects to cattle, while tick borne diseases, Anaplasmosis and Piroplasmosis will continue to cause serious economic losses.

Mastitis can cause heavy financial losses to the milk producer. Mastitis is an inflammation of the milk secretory tissues due to invading organisms causing altered secretion pain, swelling and reduced milk yield. Milking machines have contributed to the higher incidence in dairy herds due to increased mechanical irritation, trauma and spread of germs between cows due to faulty

sanitary practises. Milking machines are to bs encouraged however as they take the drudgery out of milking cows. Where hand milking is still practised, sanitary practises must be observed and the essentials of good milking technique, cleanliness regularity, stimulation for milk let down, efficient emptying of the breast and post milking disinfection must be practised. A Mastitis prevention control programme must form part of dairy herd health management.

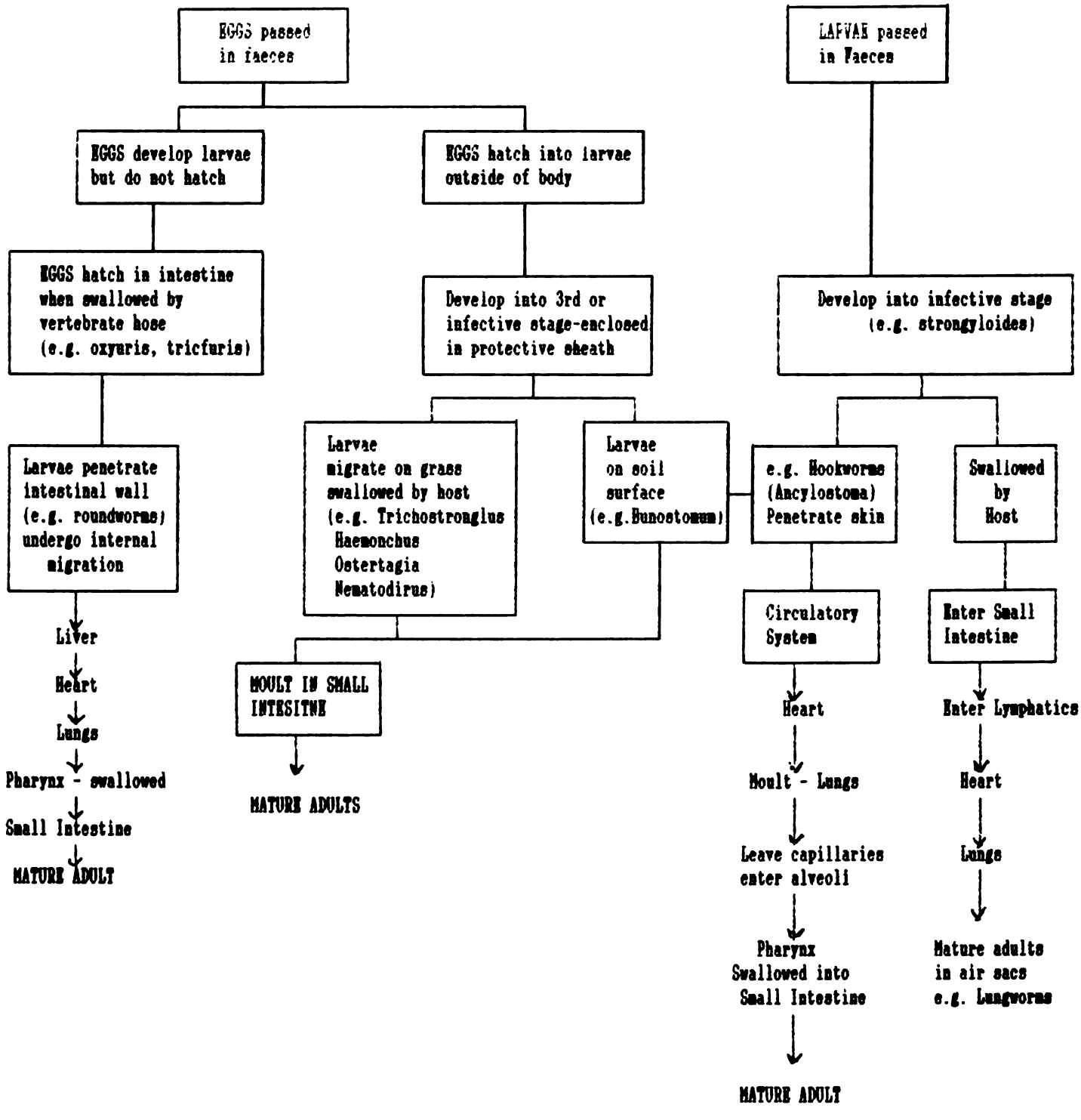
Individual animal care may be required for metabolic disorders such as milk fever and ketosis. Foul in the foot can become a herd problem. Trauma and the need for dehorning may exist. Prolapses of the reprductive tract can be unusually prevalent.

On a herd basis diseases affecting fertility like Campylobacteriosis or Trichomoniasis may need diagnostic and control practises. Campylobacteriosis maybe effectively controlled by vaccination. Trichomoniasis is self limiting and the incidence can be reduced by Artificial insemination. Leptospirosis, Infectious Bovine Rhinotracheitis, (IBR) and Bovine Viral Diarrhoea, BVD, may also be of particular concern.

Fortunately, Jamaica is considered free of Bovine Tuberculosis. Brucellosis, except for a small area in the country which is still under quarantine, is also being eliminated. Tests for these diseases may be continued as part of Public Health Surveillance in the country.

DIRECT LIFE CYCLES OF SOME GASTRO-INTESTINAL PARASITES IN VERTEBRATE HOST

e.g. Cattle, Sheep, Goat, Horse & Dog

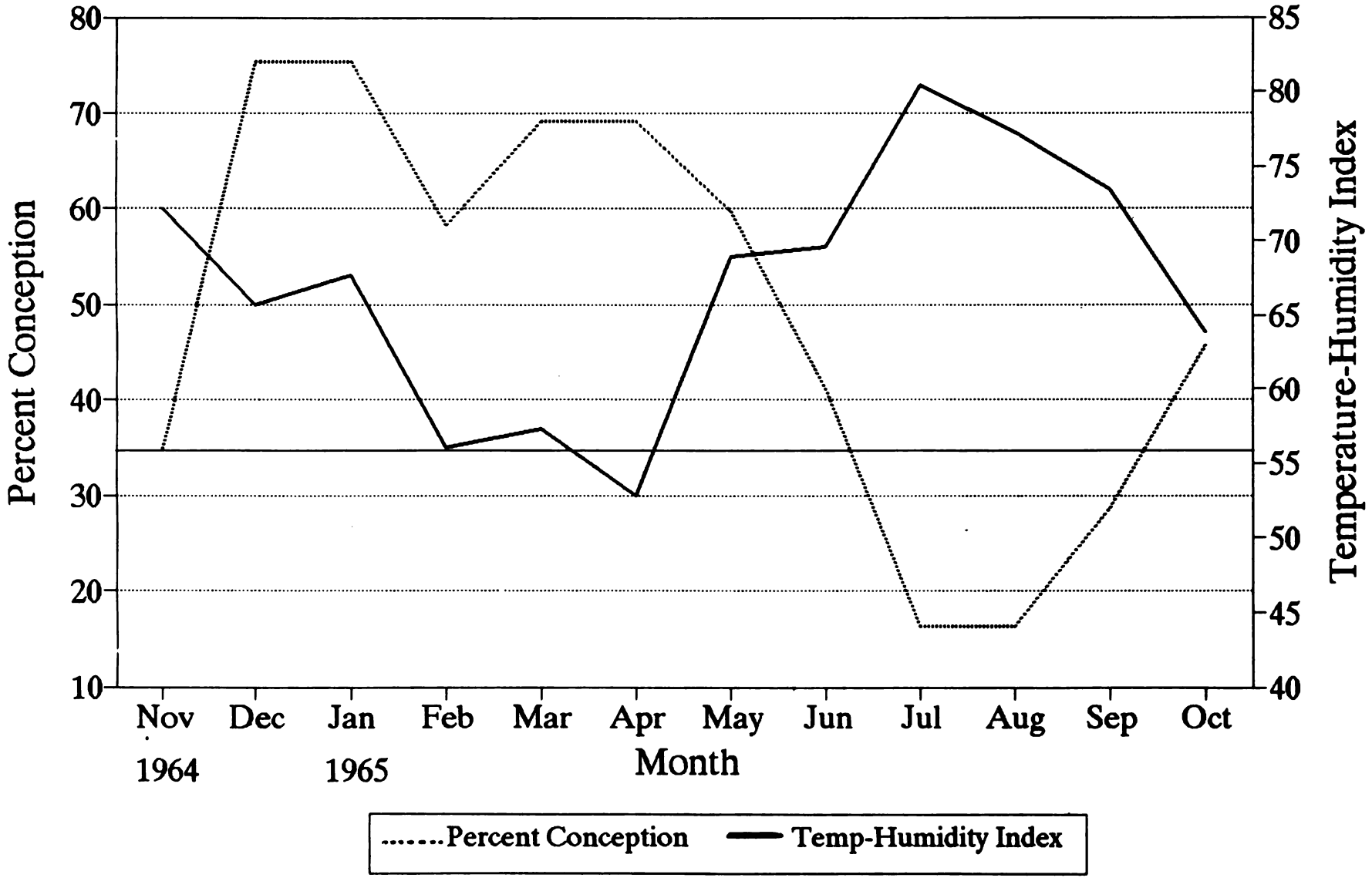


Oral ingestion in all species
Prepatent period (infective larvae to adult - + 3 weeks)

Note skin penetration in some species
Transplacental infection possible in cycle
Those with internal migration

TYPE OF PARASITE		SYMPTOMS	TREATMENT
Coccidia Intracellular Protozoa Eimeria zuraii		Sloughing of mucosa, Blood in faeces, sudden death in very young, non-immune calf. Weakness, rough hair coat; poor weight gain, poor appetite, emaciation in older animals, Prevalent in confined animals.	Amprolium (10 mgm/kgm for 5 days) Sulpha-quinoxaline, decoquinate
Cryptosporidia		Neonatal diarrhoea	Sulpha drugs Fluid therapy
Gastro-intestinal Nematodes		Diarrhoea emaciation pneumonia	Piperazine Benzimidazoles Pyrantel laevamisole Ivermectin
Roundworms (Toxocara vitulorum)	Prepatent period 10 weeks but maybe 4 weeks as prenatal infection common		
Strongyles (Haemonchus, Ostertagia Trichostrongylus, Cooperia, Bunostomum Nematodirus Oesophagostomum)	Infective larvae To adult in 18-21 days	Grazing animals From 3 months. Cause diarrhoea, rough coat, dehydration, hypoproteinaemia unthriftness, anaemia, bottle jaw, emaciation death	Ivermectin Benzimidazoles Pyrantel Laevamisole
Lungworms (Dictyocaulus viviparous))	Young animals in wet pasture. Prepatent period 21-24 days Especially in cool season	Cough, laboured breathing, weight loss, rough coat, death	Ivermectin Laevamisole (Nilverm)
Tapeworms (Moniezia sp.	Young animals Seasonal Late summer	Straining, diarrhoea, emaciation, death	Fenbendazole (Panacur) Double dose 10 mgm/kgm Albendazole Pyrantel (Strongid.T)
Flukes (Trematoda)	Intermediate hosts - snails Prepatent period 2-3 months	Liver condemnation at slaughter Liver haemorrhages/clostridial infection, death Slow growth of heifers 10% reduction in milk yield Reduced fertility	Albendazole (adults) Chlorsulon (adults and young flukes)

Relationship between Temperature-Humidity Index and Bovine Reproduction



Note: Reproduced from "Effects of Climate on Reproduction" by William W. Thatcher and Heriberto Roman-Ponce

TYPICAL VETERINARY RECTAL EXAMINATION REPORT SHEET

Pregnant	Bred too Recent for pregnancy diagnosis !	Bred non-pregnant normal	Bred non-pregnant abnormal*	Post partum cows or heifers Normal@

ABNORMAL*

Abnormality - prognosis - recommendations - treatment outlined on reverse side.
May include females with 3 or more services or post therapy cases.

FERTILITY PROGRAMME

Training	–	Heat Detection Oestrus behaviour	–	All observers
Heat Detection Devices	–	Kamar heat detector	–	Marking chalk, paint each morning Androgenized female steer Surgically altered bull
Timed Breeding	–	Heat synchronization		
	–	Prostaglandins		
Prepared observation cow charts	–	3 week period		
Veterinary examination	–	Heat prediction		
	–	Treatment of anoestrus and reproductive disorders		
	–	Pregnancy diagnosis		
	–	Reproductive Prognosis		

BODY CONDITION SCORING
(1 - 5)

PERIOD	OPTIMUM VALUES RECOMMENDED
Prior to dry-off - (60 - 100 days)	3.0 – 3.25
Dry off	3.5 – 3.75
Calving	
Cows	3.5 – 3.75
Heifers	3.25 – 3.5
21 - 35 days Post Partum	>2.5
80 - 100 days Post Partum	2.5 – 2.75
100 - 120 Days Post Partum	2.75 – 3.0

HERD GOALS –	REPRODUCTION	PROGRAM
Days open	Average 85 - 100 days	Post partum
Days in milk to first breeding	40 - 60 days	Post partum
Services to conception	1.5 –	< 2.0
1st Service conception	65%	

MASTITIS CONTROL PROGRAM

in assocation with herd management – pasture drainage – mud control

1.	Hygiene and milking practises	–	Teat washing (25 ppm iodine)
		–	Teat drying
		–	Udder stimulation
		–	Detection of abnormal milk
		–	Inflation sanitation
		–	Efficient breast emptying
		–	Post Milking Teat Disinfection (10,000 ppm iodine)
2.	Clinical cow therapy	–	Milk last
		–	Sampling
		–	Therapeutic measures
		–	segregation
3.	Dry cow therapy	–	sampling/testing
		–	selection
		–	Therapeutic Measures
4.	Milking equipment maintenance	–	Design/Maintenance Requirements
		–	Maintenance schedule – Leaky Air Hoses – Pulsators
		–	Training in maintenace, Requirements – Vacumm controllers
5.	Bulk tank sampling or Herd Testing	–	Bacteria
		–	Somatic cell evaluation

SUPPORTING THE DEVELOPMENT OF LIVESTOCK PRODUCTION IN GUYANA AND SURINAME

IICA PROJECT

A FARM PROFILE

ST. STANISLAUS DAIRY DEMONSTRATION UNIT

COMPILED BY;

DR. HECTOR MUÑOZ
DR. PETER DAVIS

ANIMAL PRODUCTION SPECIALISTS
IICA OFFICE IN SURINAME/GUYANA

MR. M. P. MANSARAM
FARM MANAGER

SOPHIA, GREATER GEORGETOWN

REVISED JANUARY, 1993

ST. STANISLAUS DAIRY FARM

1. Background

The St. Stanislaus College Farm, administered by a Farm Committee and located at Sophia, Georgetown, was established in 1975 to provide practical training for students in agriculture and generate an income from its commercial operation. At the beginning of the present decade, the achievement of objectives was affected by the general economic austerity of the country.

In 1983, the Farm Committee solicited the intervention of IICA to revitalise the Farm with emphasis on dairy production. This emphasis was in keeping with the Government's policy to increase production, and the project "Improving Dairy Production Systems in Guyana" led to the Dairy Production Demonstration Unit at the Farm in 1984. Over the nine years, the reports indicated an unprecedented level of beneficiaries, profits, and the improvement and increase of milk production at national levels.

2. Description of the Dairy Farm

The Farm is 6.8 hectares (16.8 acres) in size, of which 5.1 hectares (13 acres) are being used to produce grass and the rest of the area is occupied by buildings, trenches, dams, fish pond and road. The 5.1 hectares are planted with improved pastures (Antelope Grass, Echinochloa polystachya), 3.5 hectares (8.7 acres) of pasture are being used for the Rotational Grazing Cycle by milking cows, dry cows and heifers and 1.3 hectares (3.2 acres) are dedicated to calves and afternoon grazing of the milking cows. The remaining 0.3 hectares (0.8 acres) of grass is used as a Cut-and-Carry System for a Sheep Production Unit.

In 1983, the Dairy Herd consisted of three (3) cows, two (2) heifers and one (1) bull calf. Up to December 1992, the animals inventory of the farm was composed of nineteen (19) cows, twelve (12) heifers, two (2) female calves and one (1) breeding bull.

3. Technology and Management Practices Transferred and Adapted

3.1 Feeding Practices

- Feeding based on improved pasture of antelope grass
- Pasture Management under a 25-28 day Rotational Grazing Cycle
- Use of local by-products to supplement animal feed (e.g.wheat milling)
- Forage conservation by silage for the dry or the very wet season

3.2 Herd Animal Management Practices

- Use of a milking machine for more hygienic and uniform milking
- Twice-a-day milking with no calf stimulation
- Health and fertility testing programme implemented
- Record system to monitor performance of each animal and the herd.
- Calf Rearing with bucket-feeding to weaning at 8 weeks.

3.3 Production Infrastructure

- Solar electric fence to control grazing of pasture
- Milking parlour
- Cow and calf pen
- Milk room
- Silos for forage conservation.

4. Results

Over the past seven years, the St. Stanislaus Dairy Demonstration Unit has achieved appreciable results in the following areas:

4.1 Use of Improved Technology Transferred to Increase Production

The information collected at the Farm indicates that production, reproduction and productivity of the Dairy Unit has been improved. The following table shows some of the parameters that were improved during the seven years.

TABLE 1:

ST. STANISLAUS COLLEGE FARM
SUMMARISED DATA 1983-1992

PARAMETERS	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Total Milk Production (l)*	2,430	16,901	24,331	24,516	31,718	38,588	40,060	42,851	43,966	50,409
Av. Lactation/ length/Year	426	232	256	249	236	233	294	290	361	308
Av. Milk/Cow/ Lactation (l)	1,215	2,066	2,044	2,199	2,218	2,173	2,626	2,765	3,155	2,948
Av. Milk/Cow/ Day (l)	4.5	8.5	7.3	7.8	8.6	9.0	8.8	9.0	9.0	9.7
Av.No.Cows Milked/Day	-	6	9	9	10	11	12	13	13	14
Milk Production/ Ha (l)	714	3,930	5,688	5,701	6,219	7,566	7,855	8,402	9,237	10,502
Stocking Rate (A.u /Ha)	1.1	2.7	3.8	4.0	4.8	5.2	5.2	5.8	5.7	5.9
Calving Interval (Days)	-	455	367	360	340	352	368	356	441	374
Open Days	-	158	101	78	72	57	102	103	155	95
Av. No. of Services/ Conception	-	1.2	1.1	1.0	1.2	1.0	1.8	1.2	1.9	1.7
Total Animal Units (A.u)**	-	11.5	16.3	17.3	24.3	26.5	26.6	29.0	27.2	28.5

Source: SUPPORTING THE DEVELOPMENT OF LIVESTOCK PRODUCTION SYSTEMS IN GUYANA - IICA PROJECT

* 1 Liter (l) = 1.7 pts milk

** 1 animal Unit (A.u) = 800 lb animal

4.2 Increased Number and Improved Skill of Farmers, Students and Technical Personnel Trained

The improved dairy production technology used and generated by the project has been used to train personnel in different production areas in the following activities shown in Table below.

TABLE 2: TRAINING ACTIVITIES PERFORMED AND NUMBER OF PERSONNEL TRAINED AT ST. STANISLAUS FARM

	NO. OF PERSONNEL TRAINED		
TYPE OF ACTIVITY	**FARMERS**	**STUDENTS***	**TECHNICAL**
Field Day	408	152	128
Special Demonstration	42	220	51
One Week In-Service Training	62	-	-
Special Visits	51	350	50
TOTAL	563	722	229

* Included school children.

4.3 Its Contribution to Increasing Milk Production at National Level by Promoting and Disseminating Improved Technology

Using the St. Stanislaus Dairy Model, the IICA project has been used as a model to support the National Dairy Development Programme by transferring the technology to farmers. Dairy farmers from different areas and regions have completely or partially adapted the St. Stanislaus model (see Table 3).

LIST OF FARMERS WHO HAVE BEEN ASSISTED BY IICA IN COMPONENTS OF A DAIRY PRODUCTION SYSTEM

REGION	FARMER	LOCATION	PASTURE	ROTATIONAL GRAZING/ ELECTRIC FENCE SYSTEN	MILKING MACHINE	PEN DESIGN	MANAGEMENT SYSTEN	TRAINING OF FARM PERSONNEL	INFORMATION SYSTEM	ON-FARM ENSILAGE DEMON-STRATION
2	F. Gobin	Joanna Cecilia	X	X	X	X	X	X	X	-
	S. Bacchus	Affiance	X	X	X	X	X	X	X	-
	J. Rebeiro	Windsorcastle	-	X	X	-	X	X	X	-
	H. Hack	New Road, Charity	X	X	-	-	-	-	X	-
	N.O.C	Onderneeming	X	X	X	X	X	X	X	-
	P. Barakat	Charity	X	X	X	-	X	-	X	-
3	P. Singh	Crane, W.C.Dem	-	-	-	-	X	X	X	-
	P. Dayal	Crane, W.C.Dem	X	X	-	-	X	X	X	-
	G. Singh	Hague, W.C. Dem	-	-	-	-	-	-	X	-
	T. Bollers	Fellowship, W.C. D	-	-	-	-	-	-	X	-
	Yassin	Orangestein	-	-	-	-	-	-	X	-
	T. Davis	Parika, E.B.E	X	-	X	X	X	-	X	-
	*S. Perry	Parika, E.B.E	-	-	-	-	-	-	X	-
4	Wilderness Enterprise	Silverhill, E.B.D.	X	-	X	X	X	X	X	X
	E. Spellen	Timehri, E.B.D.	X	X	X	X	X	X	X	-
	S. Correia	Land of Canaan	X	X	X	X	X	X	X	-
	G.D.F. Farm	Garden of Eden	X	X	-	-	X	X	X	-
	M. Viera	Houston , E.B.D	X	X	X	X	X	X	X	-
	*V. Burnham	Botanical Gardens	-	-	-	-	-	-	X	-
	St. Stanislaus	Sophia	X	X	X	X	X	X	X	X
	*University of Guyana	Turkeyen, E.C.D	-	-	-	-	-	-	X	-

REGION	FARMER	LOCATION	PASTURE	ROTATIONAL GRAZING/ ELECTRIC FENCE SYSTEM	MILKING MACHINE	PEN DESIGN	MANAGEMENT SYSTEM	TRAINING OF FARM PERSONNEL	INFORMATION SYSTEM	ENSILAGE DEMON-STRATION
	*GSA	Mon Repos	-	-	-	-	-	-	X	-
	*REPAHA	Mon Repos	-	-	-	-	-	-	X	-
	L. Lewis	Bachelor's Adventure	-	-	-	-	-	-	X	X
	President's College	Golden Grove	X	X	-	-	X	X	X	-
	J. Kissoon	Cove & John	X	-	X	-	X	X	X	-
	Camp Cocos	Hope, E.C.D	X	X	-	X	X	X	X	-
	Ashram Orphanage	Unity, E.C.D.	X	-	X	X	X	X	X	X
5.	Fairfield Investments Ltd.	Fairfield	X	X	X	X	X	X	X	X
	G. Fraser	Bushy Park	X	-	X	-	-	X	X	-
6	Berbice High	New Amsterdam	X	-	-	-	X	X	X	-
	Fung-a-Fat	Corentyne, Berbice	X	X	X	X	X	X	X	-
	D. Fraser	Corentyne, Berbice	X	X	X	X	X	X	X	-
	R. Rambarack	Corentyne, Berbice	X	X	X	X	X	X	X	-
	R. Hanoman	Corentyne, Berbice	X	X	X	X	X	X	X	-

* Project Profiles Prepared Only

5. Conclusions

From the results shown above, three main conclusions can be drawn:

- The dairy technology promoted by the IICA Project and adapted by St. Stanislaus Farm has contributed to increased and improved production, as well as to a healthy and strong economy of the Farm.

- The success of the St. Stanislaus Dairy Model has contributed to the smooth and fast dissemination of the technology promoted by the IICA Project.

- The training of farmers, students, farm and technical personnel has been more complete and productive through the use of a real and on-going productive dairy system.

SUPPORTING THE DEVELOPMENT OF LIVESTOCK PRODUCTION
IN GUYANA AND SURINAME

IICA PROJECT

IICA OFFICE IN GUYANA

HERD MANAGEMENT

OF

ST. STANISLAUS DAIRY DEMONSTRATION UNIT

AT

ST. STANISLAUS COLLEGE FARM

SOPHIA BACKLANDS

GEORGETOWN

COMPILED BY

DR. PETER DAVIS
DR. HECTOR MUNOZ
MR. M.P.MANSARAM

MAY, 1993

MANAGEMENT OF THE BREEDING HERD AT ST. STANISLAUS COLLEGE DAIRY FARM

Herd Management refers to the practices in the day to day handling of the herd to achieve the maximum production from each animal and the farm as a whole:

1. **Efficient utilization of farm labour;**
2. **Effective maintenance of herd health; and,**
3. **Maximum use of available land for pasture.**

At the St. Stanislaus College Dairy Farm, the breeding herd is managed within an integrated system of simple dairy production practices, which include a feeding regime, a milking routine, herd health and reproductive management practices, breeding and record keeping. A description of these practices are as follows:

1. FEEDING REGIME

Forage:

The main feed is a good quality forage, Antelope grass (**Echinochloa pyramidalis**) which is grazed fresh at 26 days. Each adult cow (400kg), or one animal unit, is estimated to consume at least 10% of its body weight or 40kg/day of fresh grass (approximately one bundle). When Antelope grass silage is fed, approximately 20kg is required per animal unit.

Forage of high dry matter, high crude-protein and low fiber contents has been consistently obtained from Antelope grass pastures grazed in a cycle of twenty six (26) days. Control of the grazing has been achieved by an electric fence powered by a solar charger. With this system of grazing management, labour requirements for feeding is minimal.

Supplements:

Supplemental feeding for the milking cows consists of 2kg of wheat milling at each milking. Depending on the availability of copra meal, it is occasionally mixed with the wheat milling in a combination of 30 parts copra meal to 70 parts wheat milling.

Additionally, ad-libitum feeding of mineral block salt ensures supplementation of minerals such as calcium, phosphorus, magnesium, zinc, selenium, copper, etc.

Recently, the feeding of legume plants has been intensified in an attempt to replace the use of supplemental feeds. Legume plants on the farm include Glericidia, Leucaena, and Erythrina. The leaves are used in silage or fed fresh along with silage to the animals while they are penned.

2. HERD HEALTH

Internal Parasites

The animals are treated routinely for internal parasites. Dry cows are given Ivermectin or, upon freshening (calving) are treated with a Levamisole base dewormer three days before the milk is used for human consumption.

External Parasites

Treatment for external parasites including ticks is mostly around the onset of the rainy season and therefore not more than twice a year. A pour-on type acaracide (tickicide) e.g. "Bayticol", has been found to be most effective due to its residual effect over a six week period, even in the rainy season.

Mastitis

Mastitis control is closely coordinated with the milking procedures. Regular California Mastitis Test (CMT) is performed twice a month and on all cows to be dried off or suspected to have mastitis. Treatment is instituted on all cows reacting as "CMT-Trace" in this test using a series treatment (two to three syringes of antibiotic depending on the type of preparation) of Lactating cow treatment. Cows bèing dried off and also reacting to the CMT are treated with one syringe of Dry cow treatment per affected quarter.

3. REPRODUCTIVE MANAGEMENT

Two main goals of reproductive management at the farm are:

1. for each cow to produce a calf a year, and
2. for the herd to calve year-round.

The near-achievement of these goals has contributed to maintenance of a consistent level of total farm milk production from month to month over last ten the years.

Reproductive management consists of rigid practices which are applied to each cow from one calving to the next. These management practices are as follows:

- At seven months of pregnancy, heifers are put in with the milking cows when they are going through the milking parlour to get them accustomed to the parlour;

- When signs of impending parturition (calving) are seen, the heavily pregnant cows/heifers are housed in a clean, dry area which is large enough to allow the animal at least to turn around easily during delivery. The animal is checked regularly to ensure no complications arise, especially during calving;

- Following calving, **NO NURSING BY THE CALF** is allowed! The calf is separated from the cow, as soon as it is able to stand, to prevent the cow from developing a dependence on calf stimulation for milk-letdown. Calf stimulation also results in the cow taking a long time to come into heat and to conceive, i.e., long open days;

- A postpartum (after calving) rectal palpation needs to be done especially if all the fetal membranes (afterbirth) were not passed out. Retention of afterbirth could lead to a uterine infection and could therefore decrease the cow's fertility;

- After a cow or heifer calves, first heat can be expected in about 21 - 30 days. The animal is **NOT** bred on this first heat but definitely on the next heat! It is very important that this second heat be observed and the animal be bred. Most farmers usually observe their cows for heat when they come in to be milked or when they are penned;

- Natural service (bull) is done at "standing" heat while artificial insemination is performed about 12 hours after signs of heat;

- The animal should conceive (become pregnant) within 90 days and should not require more than 3 services for conception;

- Drying off should be NOT LESS than 60 days before the anticipated calving date.

4. MILKING ROUTINE

An average of fifteen cows are milked twice daily, at 4.00 a.m. and at 2.00 p.m.. The cows come into the waiting area on their own before milking time and go back out to pasture soon after milking. A portable milking machine is used for more hygienic and uniform milking and also to decrease milking time.

A routine of standard milking procedures allows for efficient and effective milking to maximize milk yield from each cow as well as detect the presence of disease conditions of the udder, and therefore the milk.

Cows are milked with a milking machine and without calf stimulation. Milking procedures are as follows:

1. - Feed is put in a feed trough in the milking parlour;

2. - The cow is let in from the waiting area to the milking parlour and restrained with a chain behind the hind legs of the cow;

3. - The udder is rinsed off using clean water;

4. - First milk is stripped out by squeezing teat once or twice, and the stream of milk is directed onto a dark/black surface to check for clots in the milk. This is a simple but essential test for clinical mastitis (infection of the milk gland); If the California Mastitis Test (CMT) is needed, the best time is just after the first one or two strippings of milk from the teats. This tests for subclinical mastitis; Milk from quarters which react to the CMT is discarded or fed to the calves;

5. - The udder and teats are washed and massaged for about a minute until the udder appears to become tight and the teats feel firm;

6. - Excess water is allowed to drip from the teats or, if available, each teat is dried with separate paper towels. The same towel should not be reused for any other teat or animal since that would spread infection;

7. - The clusters of the milking machine are attached to the teats taking care not to fold the teat in the teat-cup. Milk should begin to flow after suction of teat-cups fixes the cluster onto the teats. Milk flow may last for about five minutes, dependent on the bore of the teat canal, the size of the teat in relation to the teat cup and the amount of milk which is letdown;

8. - When milk flow slows, the cluster is pulled gently downward to relieve the pressure on the udder and at the same time to strip out residual milk. When the milk flow almost stops, the clusters are detached from the teats;

9. - As a precaution to prevent mastitis, all excess milk in the udder after cluster removal is removed by hand-stripping.

5. THE BREEDING HERD

Genetic Composition:

The dairy herd consists of up-graded "Creole" cows, most of which are crosses varying between 3/8 to 5/8 - Holstein. The present herd consists of cows which are part of, or are descendants from, the original batch of "Creole" cows which were introduced to establish the farm.

Breeding:

A modest breeding program of crossing Guyana's "Creole" cows with mostly pure-breed Holstein has produced a well-adapted and high-producing herd. Desirable breed characteristics from the "Creole" and the Holstein have been selected for the hybrid to survive on the harsh marshy grazing conditions of the coast.

> The "Creole" contributes - disease resistance, heat tolerance and adaptability to harsh grazing environments.
>
> The Holstein contributes - high milk yield, docile temperament.

Cows:

Selection criteria for cows is based on evaluation of their production and reproduction performance. Also, cows which do not respect the electric fence while grazing have to be removed from the herd.

Bulls:

Breeding is mostly by natural service and occasionally artificial insemination. The herd consists of one bull and is replaced every three to four years. The decision to replace the bull depends on the following criteria:

a) Fertility of the bull;

b) Rate of sexual maturity of replacement heifers related to the bull;

c) Presence of related replacement heifers or cows on the farm;

d) The breed of bull required to maintain the herd phenotype within the range of 3/8 to 5/8 Holstein/"Creole" crosses.

Bull calves born on the farm are not grown for breeding but are sold.

Replacement Heifers:

Selection of heifers for replacement is based mostly on the productivity of the dam. The final selection of heifers for breeding depends on the growth rate and their temperament in relation to respect for the electric fence.

Herd Performance

In the last three years, the herd has demonstrated that the average milk production per cow per day has continued to increase even after the production system was fully established. This increase in individual cow production may be attributed (at least in part) to a genetic response of the animals' adaptation to the system.

There has also been consistency in improvements in performance heifers reared on the farm.

A summary of the farm performance has been represented by parameters as shown in the table below:

TABLE OF SSCF PERFORMANCE

ANNEXES

DAIRY FARM SURVEY QUESTIONAIRE

1. GENERAL FARM INFORMATION

Name of Farmer _____

Name of Farm _____

Address _____

Size of Farm _____(Acre/Ha) No. of Plots_____

What is your farm's major activity?_____

How many years experience do you have with dairy cows? _____

For how many years have you been earning a living from selling milk?_____

2. Farm Resources

2.1 Land

What is the total land area under your control?_____(Acre/Ha)

How much land are you farming?_____(Acre/Ha)

Is your land fenced?_____(Y/N) How many sections?_____

Distance from market (Km)_____

Topography	Highland	_____%	_____(Ha)
	Lowland	_____%	_____(Ha)
Soils	Clay	_____%	_____(Ha)
	Sand	_____%	_____(Ha)
Land Use	Pasture	_____%	_____(Ha)
	Crops	_____%	_____(Ha)
	Forest	_____%	_____(Ha)

Irrigation (Y/N) _____ Type_____

Drainage (Y/N) _____ Type_____

How is your farm land owned?

Owned_____ Rented_____

Please describe how you utilize your land.

Type of Crop	Species	Area (Ha)
Improved grasses		
Natural Grasses		
Cutting Grasses		
Vegetables		
Root Crops		
Fruits		
Fallow	n/app.	
Other		

2.2 Buildings on your land.

Type	No.	Size	Material	Age
House				
Shed				
Cow pen				
Calf pen				
Bull pen				

2.3 Please describe the machinery and equipment on your farm?

Item	No.	Brand/Size	Age
Milk cans			
Milking machine			
Jeep or Car			
Pick-up			
Motorcycle			
Wagon/Trailer			
Tractor			
Spray pump			
Water pump			
Plough/Harrow			
Mower			
Chopper			
Vacuum Pump			
Vacuum Pump			
Other			

2.4 Livestock

Dairy Cattle	Number	Breed
Milkers		
Bred Heifers		
Open Heifers		
Heifer calves		
Bull calves		
Bulls		
Dry Cows		

Other Livestock	Number	Breed
Beef		
Sheep		
Goats		
Pigs		
Poultry		
Horses		
Mules		
Other		

3. Production Systems

3.1 Which of the following best describes your farm?

Dairy only_____
Dairy/Beef_____
Beef/Dairy_____
Dairy/Other_____
Other/Dairy_____
Please Describe_____
_____
_____

3.2 Milking

How much total milk does your farm produce per day?_____(gallons/lbs)

What is the average milk production/cow/day?_____(gal/lbs)

Do you milk once or twice per day?_____

At what time(s)? _____ am _____ pm

By hand _____ By machine _____

Do you milk cows in the presence of calves?_____

How much milk do you give the calf?_____lbs/day

How long does the calf remain with the cow after milking? _____(hrs)

When do you wean your calves?_____(mos) _____(lbs)

Where do you milk your cows? Describe_____

_____

Do you clean the udder and teats before milking?_____

With what?_____ Dry them_____

Do you check for mastitis?_____(Y/N) How?_____

Do you treat the teats after milking?_____(Y/N)

What do you use?_____

3.3 Health

What are the main diseases/causes of death in your herd?
Internal parasites_____
External parasites_____
Brucellosis_____
T.B._____
Other_____

Do you treat your animal against any diseases?_____

What products do you use?_____

How many animals die per year/have died over the past five years?_____

3.4 Marketing

What percentage of your milk production do you sell?_____%

What percentage of the farm's total income does this represent?_____

Where do you sell your milk?_____

Who sells your milk?_____

To whom do you sell your milk?_____

How much do you receive for your milk?_____($/Kg)

What other farm products do you sell?_____

3.5 Costs

What are your farms major operating costs?_____

Feed_____% Labour_____% Other_____%

How much do you spend on your milk operation per week/per month? (Dollar amounts by category)

Do you keep any records of your farm operation? _____ (Y/N)
On what?_____
Production_____ Financial_____ Breeding_____

3.6 Feeding

What is the percentage breakdown of feed for your milking cows?
Pasture _____
Concentrates _____
Cut grass _____
Molasses _____
Other byproducts_____

Do you keep your cattle in separate groups? _____ (Y/N)

Do you manage your pastures? _____ (Y/N)
Zero grazing_____
Intensive (Rotational)_____
Extensive (Continuous)_____

Do you have pasture divisions (paddocks)?_____(Y/N)
How many?_____ Describe_____

If yes:
What is the size of each paddock?_____(Acre)

How long is the grazing period for each paddock_____(Days)

How long is the rest period for each paddock?_____(Days)

Does the rest period change during the year?_____

How do you decide on the length of the rest period? Describe
_____
_____

Number of hours milking cows graze per day?_____

Do the cows have access to water in each paddock?_____

Do you apply fertilizer to your pastures?_____
Chemical_____(Kg/Ha) What type_____
Organic_____(Kg/Ha) What type_____

Do you clean and weed your pastures?_____
By hand_____ By machine_____
By chemicals_____ What type?_____

What type of pasture fence do you use?
Barbed wire_____
Electric fence_____
Barrier fence_____

Please describe maintainance done to fences each year._____
_____
_____

3.7 Breeding

What is the average length of lactation per cow?_____(Days)

Which system do you use to breed your female cattle?
Natural_____ A.I._____

If A.I., who renders the service?
State_____ Private_____ Self_____
What is the cost per service?_____($)

At what age do you breed your heifers?_____(mos) _____(lbs)

How long after calving do you breed back your cows?_____(wks)

How many services do you need per pregnancy?_____

What is the average calving interval for your cows?_____(mos)

Do you have a special place for your cows to calve?_____(Y/N)

4. General

What are your farms biggest problems?_____

What goals do you have for your farm?_____

What do you need in order to meet those goals?_____

Do you enjoy dairy farming?_____

Do you intend to stay in the dairy farming business?_____

Do you have any comments you would like to share?_____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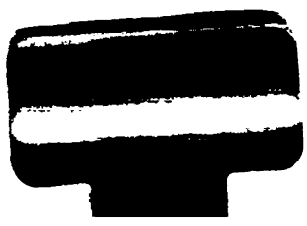

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