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SURINAME, PARA AND SARAMACCA DISTRICTS DAIRY FARM SURVEY

Ministry of Agriculture, Animal Husbandry,
Fisheries and Forestry (LVV&B)
and
Inter-American Institute for Cooperation on Agriculture (IICA)

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PARAMARIBO, SURINAME, JUNE 1984

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Presentation of the Document

A diagnostic study of the milk production sector in Suriname with particular reference to Para, Saramacca and Suriname Districts was jointly organized and implemented by the Ministry of Agriculture, Animal Husbandry, Fisheries and Forestry and the Inter-American Institute for Cooperation on Agriculture. It was a direct response to the concern expressed in the plan of action presented by the Government of Suriname, in which the major aim is to increase domestic milk production so that imports of milk powder can be reduced.

The objectives of the diagnostic study are to identify the systems of production characterising dairy farms in Suriname, the levels of production and productivity, the limiting factors and constraints to milk production and also to outline a programme for the development of the milk production sector in Suriname.

Based on the survey results and the analysis of the dairy sector increase in milk production and productivity by improving the existing system, seems to be the most viable and appropriate approach in the short term (10 years) in Suriname.

Guillermo E. Villamueva
Director of IICA in Suriname

Preface

This final report on Improving Dairy Production Systems in Para, Saramacca and District Suriname is the result of a collaboration between the Government of Suriname and the Inter-American Institute for Cooperation on Agriculture (IICA).

Technicians of the Government of Suriname provided assistance in the technical, organisational and administrative areas and the IICA Office in Suriname received assistance from professionals in the Guyana Office.

1. BACKGROUND

The Suriname Office of the Inter-American Institute for Cooperation on Agriculture (IICA) has undertaken to provide assistance to the Government of Suriname in its efforts to develop and increase dairy production. The request for assistance from the Government of Suriname is partly a result of and certainly in keeping with the Plan of Action presented by the government on May 1, 1983. This governmental plan of action covers the period 1983 to 1986 and its objectives in the Animal Husbandry subsector are stated as follows (Page 27):

> "We aim at raising milk production to 75% of national need on a medium term, so that the import of milk powder can be reduced. A farmer's advisory service will have to be set up as a centre of information. The facilities for artificial insemination shall be decentralised this year in order to improve the related services.
>
> The Agricultural Bank shall make possible the necessary financing for small dairy farms. The bran problem shall be studied and the necessary adjustments made to improve the distribution. "Landsboerderij" (the state farm) shall be turned into a research centre for dairy cattle, and will provide the necessary practical information for the farmers. The consumption price of milk and dairy products shall be adjusted."

Thus, the major aim of the government is to increase domestic milk production so that imports of milk powder can be reduced. It is recognised that the support services (research, extension, credit, inputs) to the dairy production sector will have to be strengthened and developed as a prerequisite to a sustained increase in milk production.

IICA recognised the importance of these changes in the dairy sector. In a summary report of an IICA mission to Suriname to evaluate milk production and productivity, measures essential to the achievement of these goals were detailed (Page 3).
Among the short-term actions recommended were:

a) A diagnostic study of the dairy production sector.

b) Institutional strengthening of agencies directly related and important to the successful functioning of the dairy supply system (research and extension, milk distribution, input supply).

c) Preparation of a national large scale dairy development project for Suriname.

This report addresses the first of these recommended actions.

1.1 Objectives of the Diagnostic Study

The study reported here is referred to as "a diagnostic study of the milk production sector in Suriname with particular reference to Para, Saramacca and District Suriname". Its specific objectives are:

1) To identify the systems of production characterising dairy farms in Suriname.

2) To identify the levels of production and productivity characterising dairy farms in Suriname.

3) To identify the limiting factors and constraints to milk production in Suriname.

4) To outline a programme for the development of the milk production sector in Suriname, given the analysis of the survey.

1.2 Methodology

The preparation, execution and analysis of a survey was chosen as the method for conducting the study. A cross-sectional analysis of randomly sampled farmers in the three major milk-producing areas of Suriname was conducted. A preliminary visit to a few farms was made and a questionnaire was prepared. The questionnaire was finally developed with the participation of extension officers and animal health assistants working in the areas to be surveyed. These officers were trained both in essential survey techniques as well as to the kind of technical detail expected as responses. After training and initial revision of the questionnaire, the officers tested the survey on farmers in their district. On the basis of this test the questionnaire was revised and prepared for full-scale implementation. A copy of the final form of the questionnaire appears as Annex 1.

The farms in each area were separated into three categories on the basis of size. Table 1.2 below shows the number of farms by size

Table 1.2

Sampling Procedures on

Cattle Farms in Para, Saramacca and District Suriname

District and Size Category*	Total No. of Farms	No. of Farms Surveyed	Sampling Percentage
Para: 3-10	237	5	2
11-50	67	16	23
50+	6	2	33
Sub-Total	310	23	7
Saramacca: 3-10	215	30	14
11-50	27	5	19
50+	1	1	100
Sub-Total	243	36	15
District Suriname: 3-10	1987	99	5
11-50	221	31	14
50+	11	2	18
Sub-Total	2219	132	6
	2772	191	7

* Size No. of head of cattle

category in each area surveyed. The sampling percentage and the number of farms finally surveyed are also shown. District Suriname was implemented in terms of its three sub-districts; Suriname A (36 Farms), Suriname B (67 Frams) and Suriname C (29 Farms). With Para and Saramacca, this made five areas for the survey implementation. In each area with the exception of Suriname B, the number of farms was divided equally between two surveyors. In Suriname B, three surveyors were used. The information for analysis was collected during the first three weeks in October, 1983.

1.3 Overview of the Milk Production Sector

Milk is produced on cattle farms throughout Suriname. However, due to their proximity to the only milk plant in the country, three areas dominate the milk supply sector. These are Para, District Suriname and Saramacca. Table 1.3 shows cattle farms, cattle and areas of grassland in Suriname in 1981. It is estimated

Table 1.3
Cattle Farms and Area of Grassland in Suriname, 1981

District	Number of farms	Number of cattle	Area of grassland (ha)	Average number of cattle/ farm	Average area of grassland/ farm (ha)
Marowijne	17	284	63.5	16.7	3.7
Commewijne	444	3585	1242.1	8.1	2.8
Brokopondo	13	1280	891.0	98.5	68.5
Para	767	5645	2287.2	7.4	3.0
Suriname	4632	28220	10754.8	6.1	2.3
Saramacca	539	2831	1413.0	5.3	2.6
Coronie	178	934	1557.0	5.2	8.7
Nickerie	612	6728	2007.0	11.0	3.3
Total	7202	49507	20215.6	6.9	2.8

Source: Census, Ministry of Agriculture, 1981

that the farmers in these three areas supply 60-80% of the total milk production, which is around 25% of domestic milk requirements. These estimates are very tentative as no data for milk imports or production over the last decade were available. It is thus based on a form of judgemental analysis by senior professionals knowledgeable and experienced in the Suriname situation.

Milk is produced mainly by small farmers milking their cows by hand. Milk production systems utilized are characterised by low levels of technology and high levels of inefficiency. However, milk production apparently remains economic for farmers because of the price subsidy paid for milk. Presently, the price per litre paid to producers is Sf. 0.70 while the consumer price is Sf. 0.45. Government's policy is to increase milk production in an effort to achieve self-sufficiency.

2. RESULTS OF SURVEY

2.1 Physical Dimensions of Dairy Farms in Suriname

Table 2.1 shows the physical characteristics of dairy farms in the three selected areas of Suriname, with District Suriname separated into A, B, and C. The variation in farm size is considerable between areas, with average farm sizes being as low as 4 ha in Suriname C and as high as 16 ha in Para. Both Para and Saramacca reflect their larger distances from Paramaribo, on the average 30 km and 41 km respectively, in their access to larger farms and also the recency in occupation relative to the Suriname

Table 2.1
Physical Description of Dairy Farms in Suriname

Characteristic	Area				
	Suriname A	Suriname B	Suriname C	Para	Saramacca
Average Farm Size (ha)	11.4	4.9	4.3	16.0	14.4
Median Farm Size (ha)	5.2	4.0	4.0	10.0	7.0
Modal Farm Size (ha)	3.0	3.0	4.0	20.0	10.0
Average Plot Size (ha)	6.6	2.4	3.0	-	9.4
Farm Area on Highland (%)	34.0	45.7	46.0	73.0	56.0
Farm Area on Lowland (%)	66.0	54.2	54.0	27.0	42.0
Farm Area with Clay Soils (%)	73.0	42.1	81.0	7.0	49.0
Farm Area with Sandy Soils (%)	18.0	40.9	16.0	80.0	43.0
Farm Area with Loam Soils (%)	9.0	17.0	3.0	13.0	6.0
Farms with Irrigation (%)	3.0	0.0	90.0	0.0	15.0
Farms without Irrigation (%)	97.0	100.0	10.0	100.0	85.0
Farms with Drainage (%)	22.0	61.0	97.0	0.0	46.0
Farms without Drainage (%)	78.0	39.0	3.0	100.0	54.0

districts. In District Suriname which is closer to urban Paramaribo, the farmers have been physically situated longer and have more years of experience as farmers. In all of the areas, the form of land ownership dominating was the state lease, generally to be inherited.

The relative amount of the farming areas on highland and lowland reflected in the results was consistent with the location of the area with respect to the coastline. The dominant soil type varied between areas with clay being more common in District Suriname, while sandy soils characterised eighty percent of the farms in Para. The absence of drainage and irrigation facilities certainly was highlighted in the cases of Para and Saramacca. According to the respondents, District Suriname C was well equipped with drainage and irrigation services. This is justified on the basis of the infrastructural works put in for the large banana project in that area.

2.2 Land Utilization on Dairy Farms in Suriname

Table 2.2 shows land utilization on dairy farms in Suriname. It was not possible to obtain size of land area owned allocated to

Table 2.2
Land Utilization on Dairy Farms in Suriname
(% of farmers in the area with land use type)

Land Use	Area				
	Suriname A	Suriname B	Suriname C	Para	Saramacca
Native Grasses	79	88	97	87	85
Improved Grasses	27	13	17	78	12
Cutting Grasses	9	27	28	4	0
Vegetables	9	39	17	4	30
Fruit Crops	24	82	62	61	77
Plantains	3	13	0	13	50
Unused	27	13	3	65	69

different crops, which would be the preferred statistic in this case. As a second alternative the presence of the land use type was accepted. Thus, it was found that the majority of farmers did have pasture established for their cattle, in most cases this being only native grasses. Few farmers have established improved pastures with the exception of Para where seventy-eight percent of the farmers have pastures under improved grasses. The possibilities of expansion in Para and Saramacca are supported by the high levels of farms with unused land in these areas. This reflects both the presence of part-time farmers as well as the presence of larger land holdings in these areas.

2.3 Production Infrastructure and Equipment on Dairy Farms in Suriname

Table 2.3 shows the production infrastructure and equipment on dairy farms in Suriname. In all areas the majority of the farmers

Table 2.3
Production of Infrastructure and Equipment
on Dairy Farms in Suriname

Facility	Area				
	Suriname A	Suriname B	Suriname C	Para	Saramacca
Cow Pen (%)	79.0	90	96	100	85
Fencing (%)	66.6	22	38	83	62
Tractor	14.0	0	7	17	4
Motor Cycle	53.0	49	82	35	65
Jeep/Car	25.0	25	18	30	8
Pickup	28.0	22	21	65	27
Plough	11.0	0	7	4	4
Waterpump	8.0	1	0	78	15
Spraypump	53.0	31	38	83	58
Milking Machine	0.0	0	0	13	0

had a cow pen established for their cattle. In most instances this cow pen was part of one facility which served as a bull pen and calf pen also. In District Suriname, however, about ten percent of the farmers had a calf pen or bull pen separate from the cow pen. With the exception of Para where almost fifty percent of these pens were constructed from wood and concrete, in all other areas the pens were wholly made from wood.

Fencing of farms was more common in areas further away from the city, for instance in Para as opposed to Suriname B. Fencing consists in all cases of wood posts and barbed wire. Very few farmers in any area owned a tractor; most tractors were found in Para where seventeen percent of the farmers owned one. This finding was reinforced in the case of many other facilities where the percentage of persons in Para possessing the facility exceeded those in other areas (pick-up trucks, spraypumps, waterpumps). Para was also the only area where milking machines were found on three farms. This characteristic of Para being well equipped reflects the fact that it is located close to the state livestock farm and has been identified as a special milk producing area since the 1950's.

2.4 Livestock on Dairy Farms in Suriname

Table 2.4 shows the livestock numbers on dairy farms in Suriname. On most farms it is observed that farmers have between five to ten head of cattle although in each case a few large farms pulled up the average number per farmer. In most instances the breed of the cattle was cross. Poultry was the next most common enterprise on these farms with at least fifty percent of the cattle farmers also minding some poultry. A few sheep and goats were found in each area, the majority being in Suriname A.

Table 2.4

Livestock on Dairy Farms in Suriname*

Type	Area				
	Suriname A	Suriname B	Suriname C	Para	Saramacca
Cattle - Avg. # per dairy farmer	24.0	14	11	26	8
Cattle - Median #	10.5	8	8	21	7
Cattle - Modal Value	8.0	5	-	8	6
Poultry - Avg. # per dairy farmer	42.0	63	20	501	26
Poultry - Median #	22.0	12	15	40	24
Poultry - Modal Value	20.0	10	15	100	10

* Of the 36 respondents in Suriname A, only one respondent had pigs, four respondents had sheep (avg. of seven) and five had goats (avg. of ten).

2.5 Concentrate Feeding on Dairy Farms in Suriname

Table 2.5 shows for each cattle category the percentage of farmers feeding that category concentrates, the amount and type. As expected, greater than seventy five percent of the farmers in each area (excepting Saramacca) feed their lactating cows concentrates. For lactating cows the concentrate fed is rice bran and about 2 kg per animal. In Saramacca only fifty-two percent of the farmers feed the lactating cows concentrates, while seventy percent of them feed their dry cows. In Saramacca the percentage of lactating cows fed concentrate is reported as fifty-two percent. This is considered low; the data for concentrates fed to dry cows (70%) indicates that there may have been some confusion of interpretation between these two categories.

2.6 Pasture Utilization and Management on Dairy Farms in Suriname

Table 2.6 shows pasture utilization and its management on dairy farms in Suriname. The grazing of pastures combined with

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Table 2

Feeding of Concentrates on D

% Feeding Concentrates and T

Category	Suriname A		Suriname B		
	% Feeding Concentrate	Type & Amt. Fed kg/day	% Feeding Concentrate	Type & Amt. Fed kg/day	
	39	RB 1.8	69	RB/O 1.46	
ing Cows	91	RB 2.0	75	RB/O 1.58	
s (2-3 yrs)	31	RB 1.8	28	RB/O 1.04	
s (1-2 yrs)	22	RB 2.0	40	RB/O 0.90	
	72	RB 1.06	79	RB/O 0.71	

RB - Rice Bran
WM - Wheat Middling
O - Other (not specified)

2.6 Pasture Utilization and Management on Dairy Farms in Suriname

Table 2.6 shows pasture utilization and its management on dairy farms in Suriname. The grazing of pastures combined with feeding of concentrates is the basis of the feeding system on dairy farms in Suriname. In each area a few farmers support this feeding

Table 2.6
Pasture Utilization and Management
on Dairy Farms in Suriname

Types of Pasture Management	Suriname A	Suriname B	Suriname C	Para	Saramacca
% of Farms Zero Grazed	0	0	0	0	0
% of Farms Grazed Intensively	0	0	0	13	4
% of Farms Grazed Extensively	100	-	52	87	96
% of Farms with Pasture Divisions	33	22	-	87	12
% of Farms with No Pasture Resting Period	91	-	-	63	-
% of Farms Fertilizing Pasture	3	9	31	17	4
% of Farms Cleanning Pasture by Hand	83	100	97	91	100

N.B.: Blanks indicate lack of information

system by cutting grass for their cattle. The grazing system is classified as extensive in that there is a high land per animal

unit ratio and low levels of pasture management are practiced. Pasture maintenance activities are rudimentary; presently few farmers fertilize their pastures and all pasture cleaning activities are carried out by hand.

2.7 Herd Management on Dairy Farms in Suriname

Table 2.7 shows elements of herd management in Suriname. Generally, farmers do not identify their animals by markings nor do they manage them by categories. In District Suriname B, Para and Saramacca, breeding is done in the pasture while in Districts Suriname A and C it is done mainly on hand. Throughout the areas of the survey heifers are bred between the ages of 2.5 and 3 years. With the exception of Para, most farmers have their calves born in a pen rather than in the pasture. Para differed again from other areas in terms of weaning age of calves and time period for breeding cows after calving. The relatively shorter weaning period corresponded with the relatively sooner breeding of cows after calving.

Milking is done by hand and in Suriname C and Para it was found that a large percentage of farmers, sixty-three and seventy-eight percent respectively milked their animals twice a day. The cows are generally milked between five-thirty and seven in the morning with the second milking ten to eleven hours later. In each area the majority (greater than seventy-five percent) of farmers indicated no desire to have a milking machine. In Suriname Districts B and C, and in Saramacca, farmers indicated they supplied their cattle with an additional amount of about 20 litres of water per day. In all areas the percentage and number of farmers keeping any records was very low; six persons each were found in Suriname C and Para, three persons in Saramacca and one each in Suriname A and B. In most cases, only total milk

production and milk prices were kept as records.

Table 2.7

Herd Management on Dairy Farms in Suriname

Type of Herd Management	Suriname A	Suriname B	Suriname C	Para	Saramacca
% of Farmers using Identification	0.0	1	0.0	0.0	0.0
% of Farmers Managing by Categories	29.0	15	10.0	4.0	15.0
% of Farmers using A.I.	9.0	3	3.0	22.0	-
% of Farmers Breeding in Pasture	34.0	79	11.0	78.0	100.0
% of Farmers Breeding on Hand	60.0	15	86.0	4.0	-
Average Age Heifers Bred	2.5	3	2.7	2.7	2.6
Average Days Cows Bred after Calving	165.0	186	162.0	77.0	208.0
Calving Place: Pasture (%)	11.0	-	4.0	100.0	26.0
Calving Place: Pen (%)	63.0	100	32.0	-	74.0
Average Weaning Age (Days)	205.0	270	210.0	144.0	252.0
Milking (Once Daily - Hand) (%)	51.0	54	37.0	22.0	69.0
Milking (Twice Daily - Hand) (%)	46.0	46	63.0	78.0	30.0
Estimated Milk to Calf Daily (Litres)	1.4	3	1.5	4.0	2.4

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2.8 Animal Health on Dairy Farms in Suriname

Table 2.8 details several aspects of animal health activities on dairy farms in Suriname. Most farmers treat their calves after birth and do not consider that they have calving problems, yet they lose up to three calves on average annually and are generally unclear as to the cause of death. Most of the calves died older than three weeks. This represents a very high mortality rate in all the areas. With the exception of Saramacca, most farmers treat their cows after calving with a cleansing drench and treat them against internal parasites. Saramacca farmers, however, like the other areas, spray their animals for ticks. In none of the areas were the animals vaccinated or was a blood test done. In Suriname A and B, greater than fifty percent of the farmers utilized veterinary assistance but in Suriname C, Para and Saramacca, the percentage using this assistance fell off sharply. Of the farmers using veterinary assistance they indicated seeing the veterinarian on average twice yearly. Cow deaths were attributed mainly to strangling and sticking in the mud. Most farmers lost at least one cow per year.

Table 2.8
Animal Health on Dairy Farms in Suriname

Animal Health Characteristic	Suriname A	Suriname B	Suriname C	Para	Saramacca
1) Calf Births (Avg. #/Year)	5	3	2	11	2
2) Calf Mortality (Avg.#/Yr)	3	3	1	2	2
3) Cause of Death:					
Parasites (%)	22	8	0	0	40
Weak Calves (%)	11	38	0	67	20
Accident (%)	17	0	50	0	0
Don't Know (%)	44	23	50	33	40

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Table 2.8 (continued)

Animal Health on Dairy Farms in Suriname

Animal Health Characteristic	Suriname A	Suriname B	Suriname C	Para	Saramacca
4) Treatment of Calf After Birth:					
Navel Treatment (%)	56	12	81	0	46
Navel Treatment & Screwworm Spray (%)	25	82	19	100	42
Navel Treatment & Iodine (%)	8	0	0	0	0
No Treatment (%)	11	6	0	0	12
5) Calving Problems-Yes (%)	17	30	18	30	19
-No (%)	83	70	82	70	81
6) Cow Treatment After Calving:					
No Treatment (%)	17	3	11	13	54
Cleansing Drench (%)	90	95	100	74	42
7) Cow Mortality (Avg.#/Yr)	2	1	1	0	1
8) Cattle Vaccination:					
Vaccina (%)	0	0	0	0	0
No Vaccine (%)	100	100	100	100	100
9) Spray Against Ticks:					
Spraying (%)	92	76	68	100	50
No Spraying (%)	8	24	32	0	50
10) Treatment for Internal Parasites:					
Treating (%)	67	49	24	4	42
Not Treating (%)	33	51	76	96	58
11) Veterinary Assistance:					
Using (%)	86	52	34	39	50
Not Using (%)	14	48	66	61	50
12) Problems during Pregnancy:					
Problems (%)	11	7	7	0	0
No Problems (%)	89	93	93	100	100
13) Blood Tests:					
Tested Animals (%)	0	0	0	0	0
No Test Done (%)	100	100	100	100	100

2.9 Manpower Information on Dairy Farms in Suriname

Table 2.9 lists selected aspects of manpower information on dairy farms in Suriname. Average family sizes for persons living on the farm ranged between 3 and 5 persons. The average age of parents on the farms ranged between 45 and 53 years. Average age of children ranged between 11 and 21. The mojority of parents had some primary education while few had any secondary education. Generally, the children received more secondary education. In Suriname A and Suriname C where information is available on family on-farm duties, it was found that all family members participated equally in milking and shepherding cattle.

Table 2.9
Manpower Information on Dairy Farms in Suriname

Manpower Characteristic	Suriname A	Suriname B	Suriname C	Para	Saramacca
Average Family Size	3	4	5	3	4
Average Age of Father	51	48	49	51	53
Average Age of Mother	46	46	46	45	48
Average Age of Son	15	20	18	21	15
Average Age of Daughter	16	20	15	11	17
Parents' Education:					
% With Primary	72	77	78	61	47
% With Secondary	4	5	2	1.5	6
Children's Education:					
% With Primary	80	83	46	28	62
% With Secondary	29	14	48	53	13
No. & % Farms with Hired Labour	4 (11%)	1 (1%)	2 (7%)	12 (52%)	10 (38%)

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However, cutting grass and pasture management duties were more common among the male family members. The parents were found to spend more hours on the farm than the children, an average per day of approximately five hours to three hours. The farms hiring labour are to be found mainly in Para and Saramacca. When labour is being hired it is on average hiring two to three persons, four to six days per week at an average daily wage of Sf. 14 to Sf. 15.

2.10 Production, Productivity and Distribution of Milk on Dairy Farms in Suriname

Table 2.10 shows aspects of production, productivity and distribution of milk in Surinname. For the entire area surveyed,

Table 2.10
Production, Productivity and Distribution of Milk on Dairy Farms in Surinname

Characteristic	Suriname A	Suriname B	Suriname C	Para	Saramacca
Avg. Milk Production/ Cow (kg)	5	4.0	5.0	6.2	3.6
Avg. Lactation Period (Days)	200	229	139	-	180
Avg. No. of Calves Born/Year	5	4	3	10	2
Avg. Farmer Milk Production/Day (kg)	19	15.0	10	53	5.5
Avg. Milk Sales/Day (kg)	20	14.4	9	47	8.6
Milk Distribution: % Selling to Plant	66	73	80	100	8.04
Production System:					
Dairy Only (%)	33	3	23	0	4
Dairy Beef (%)	6	69	69	90	65
Beef Dairy (%)	-	25	4	0	31
Dairy Other (%)	56	3	4	0	0

/...

the highest daily milk production record obtained was 11 kg in Suriname A. The lowest levels were found in Saramacca and Suriname C where 8 litres was the top of the range for daily milk yield per cow. Total milk production on individual farms was highest in Para and lowest in Saramacca. A major reason for this is that Para farmers receive a higher price for their milk and daily access to inputs. The milk plant collects milk daily in the area with its own truck. In contrast, Saramacca has no milk collection service. Lactation lenght varied from a low period of one hundred and fifteen days in Saramacca to three hundred and sixty-five days in Suriname B. The milk produced in Suriname A and B was distributed mainly through the milk plant; in Saramacca a larger percentage (71%) was reported utilized at home; in the other areas this information was not recorded. The dual system of producing both milk and beef was the dominant characteristic on farms in Suriname B, C and Saramacca. Suriname A was the area in which the highest number of farms producing milk only were found. It was also the area found with the largest number of dairy farms with activities other than beef (other livestock and crops).

2.11 Farm Problems reported on Dairy Farms in Suriname

Table 2.11 shows the percentage of farmers in Suriname identifying particular areas as problems on their farms. By far the two areas standing out as problems are feeding and drainage and irrigation. Generally, this was reinforced when the type of changes they would implement if possible was requested. However, the need for improved breeding which was not stressed as a problem certainly was emphasised in terms of changes that would be implemented. Although few farmers received technical assistance (mainly from state extension services) it was not listed as a problem area.

Table 2.11

Farm Problems on Dairy Farms in Suriname

(% of farmers indicating problem area as a constraint)

Problem Area	Suriname A	Suriname B	Suriname C	Para	Saramacca
Feeding	100	100	69	74	42
Inputs	6	19	0	9	12
Animal Health	6	34	10	0	0
Breeding	31	10	0	0	0
Technical Assistence	11	7	10	0	0
Drainage & Irrigation	69	21	21	57	23
Prices & Marketing	14	33	0	4	19

3. DEVELOPMENT OF DAIRY SECTOR IN SURINAME

3.1 Identification of System of Production on Dairy Farms in Suriname

From the survey results, milk in Suriname is produced by a dual-purpose (Dairy/Beef) production system with dairy as the primary enterprise. The following findings characterize dairy farms in Suriname:

1) Farm land is generally owned by single proprietorship with a state lease.

2) Average farm sizes range between 4 and 6 ha. A large percentage of the farmers in Para and Saramacca have unutilized lands presently.

3) Most farmers have some pasture established for their cattle, mainly under native grasses.

4) Pasture is grazed extensively and is the basis of the feeding systems.

5) Pastures are not fertilized and maintenance works are done by hand.

6) Most farmers supplement grazing by feeding concentrates (rice bran) at the rate of 2 kg/day/animal.

7) Most farmers own between 5 to 10 head of creole cross cattle, although the average is higher.

8) Herds are neither identified nor managed by category.

9) Milking is done by hand once per day except in Suriname C and Para where it was found that 63 and 78% of farmers respectively milked their animals twice per day.

10) Most farmers have no physical structure, a cow pen is utilized for all their cattle.

/...

11) Average farm family size (number of persons living on the farm) ranged between 3 and 5 persons. Generally, all these family members work on the farm.

12) Average ages of parents on the farms ranged between 45 and 53 years.

13) Farms in Para and Saramacca hired labour, generally two persons/five days/week.

3.2. Levels of Production and Productivity on Dairy Farms in Suriname

Limited use of the available resources (land, by-products, animals, etc.) and poor management practices are the causes of low production and productivity found in the existing dairy production system in Suriname. The following production and productivity indicators characterize the dairy system:

1) Average milk production/cow/day ranged between 3,6 and 6,2 kg.

2) Lactation lengths ranged from as short as 115 days to as long as 300 days.

3) Milk production/cow/year ranged between 414 and 1860 kg.

4) Stocking rate varied from 1 head of cattle/ha in District Suriname to 5 head of cattle/ha in Para and Saramacca Districts.

5) First calving occurs between 3,5 and 4 years of age.

6) Calves' weaning age is 5 to 9 months.

7) High calf mortality rates cause abnormal growth in the cattle population.

8) Average total milk sales/day/farm ranged between 8,6 and 20 kg.

3.3 Limiting Factors and Constraints to Milk Production in Suriname

The constraints, technical, social and economic in nature, were identified by farmers from the survey evaluation as the main limiting factors associated with the low production and productivity found in dairy farms in Suriname were as follows:

1. Most farmers identified feeding problems as their major constraint. Both pasture production and supply system for supplements are underdeveloped and limited at the farm level.
2. Pasture management is at a very low level because of a lack of knowledge, material, inputs, equipment and support service systems.
3. Herd management suffers as a result of lack of knowledge, inputs and support service systems.
4. Little attention is paid to animal health. A high calf mortality rate was found in all areas.
5. Educational levels of farm families were generally low.
6. Farmers' horizons are presently limited. They appear reluctant to change their basic systems because they do not know any other alternative.
7. Technical assistance of any kind is very difficult to come by. Farmers seemed not to demand technical assistance because they were unaware of the positive changes that might arise from it.
8. Credit, pricing and marketing arrangements need to be rationalized through economic analysis.

3.4 Programme for Development

3.4.1 Demand and Supply Projections for Milk

In Table 1 is shown the estimated amount of milk needed to cover the projected demand of the population for the period 1982 to 1988, assuming a per capita consumption of 38 kg/year and a population growth of 2%/year.

The actual milk production in Suriname is estimated at 7.000.000 kg/year of which 5.000.000 is collected and processed by the Milk Plant in Paramaribo.

Table 1

Milk Consumption Requirement, Milk Production Trend and Powdered Milk Imported and Costs

ITEMS	YEARS 1982	1984	1986	1988
	POPULATION ('000)*			
	370	385	411	428
Milk Requirements (Tons)**	14100	14500	15500	16200
Local Milk Production Trend (Tons)	4800	5300	5800	6500
Powdered Milk Imports (Tons)	560 (a)	750 (a)	1000 (b)	1000 (b)
Milk Imports Cost (Sf'000)	3000	4000	5300	5300

* 2% growth/year

** 38 kg/capita

*** Trend to reach 1966 production level

(a) Population requirements not met

(b) Population requirements met

Source: Adapted from Milk Plant 1982 Annual Report and Ministry of Agriculture Proposal for an Agricultural Programme and own projections.

In order to cover part of the estimated demand, the Suriname Government has been importing annually powdered milk (6.000 tons) which in 1982 cost a total of Sf. 3.000.000.

According to the Milk Plant Annual Report, 1982 the Milk Plant is the only agency authorized by the Government to sell milk, milk production in Suriname has been decreasing since 1966 when the Milk Plant collected 7.000.000 kg. In 1979 milk production reached its lowest level (2.300.000 kg). These fluctuation in production are seen to be related with the sharp increase in production costs and a low price paid to farmers.

After 1978, milk production started to increase as a result of a better price paid to the farmers (Sf. 0,70/kg but at the same time Government established a subsidy to the selling price for milk consumers (Sf. 0,46/kg).

It is estimated that for 1988 the milk needed to cover the demand will total 16.200 tons, which means an increase in milk production of 53% or continued milk importation with the consequent depletion of foreign exchange.

A proposal to be self-sufficient in milk production for 1986 and reducing powdered milk and milk product importations to zero has been put forward by the Government in its Agricultural Programme for 1982-1986. This expectation seems to have a very low probability being achieved because at present no programme to increase milk production is being carried out. Table 2 shows the livestock targets for this period for different commodities. It was assumed that an investment of Sf. 12.000.000 for expansion of dairy to new areas, credit for the private dairy sector and improvement of the processing facilities would be required in order to attain the established dairy targets. However, the formulated strategies for increasing production and productivity in the sector are not clearly identified in the Agricultural Programme.

Table 2

Suriname Livestock Production Targets (Tons)

Items	1982	1986
Poultry		
- Meat	8700	9600
- Eggs	3650	4000
Pork	1070	1500
Cattle		
- Milk	7000	15500
- Meat	1188	2162
	Projected Imports in Tons	
Pork	330	0
Milk	6000	0
Beef	1800	1200

Source: Ministry of Agriculture Proposal for an Agricultural Programme

3.4.2 Programme for Improving the Existing Dairy Production Systems in Para, Saramacca and Suriname Districts

An increase in milk production can be obtained by improving the existing system, expanding and developing new dairy areas and by a combination of these two approaches. However, based on the survey results and the analysis of the dairy sector, the first approach seems to be the most viable and appropriate to increasing dairy production and productivity in the short term (10 years) in Suriname.

a. Existing Available Resources

In Table 3 are shown the results of the 1981 census. This information indicated that a total of 15.464 dairy cows were counted in the census in Para, Saramacca and Suriname Districts. A very similar amount of dairy cows was estimated by the survey projection (Table 4). The difference found is partially due to the fact that the survey was done two years later (1983) and to the sample size used by the survey.

/...

Table 3

Farms, Cattle and Dairy Cows in Suriname

District	Number of Farmers	Number of Cattle	Dairy Cattle	
			Milking Cows	Dry Cows
Marowijne	17	284	74	36
Commewijne	444	3585	638	647
Brokopondo	13	1280	414	9
Para	767	5645	1235	1088
Suriname	4632	28220	8175	3906
Saramacca	539	2831	852	208
Coronie	178	934	258	184
Nickerie	612	6728	2884	383
TOTAL	7202	49507	14530	6649

Source: Ministry of Agriculture, 1981.

Table 4 shows the existence of 2772 dairy farms (10 ha/farm) in Para, Saramacca and Suriname Districts with an average of 6 dairy cows per farm.

Table 4

Dairy Cattle Population in Para, Saramacca and Suriname Districts based on Survey Projections

District	Number of Dairy Farms	$\bar{X}$ No. of Dairy Cows/Farm	Total No. of Cows
Para	310	8	2480
Saramacca	243	6	1458
Suriname	2219	6	13314
TOTAL	2772		17252

Source: Dairy Farms Survey, 1983.

/...

The survey projection also indicates that a total of 17,252 dairy cows may contribute to increasing milk production if some improved practices can be introduced into the actual dairy systems in order to remove the main constraints and factors which are limiting milk production.

b. Improved Changes Needed

Table 5 shows the current technical parameters that characterise the existing dairy population and the level of the improvement needed to increase milk production for selfsufficiency in milk over a 10-year period.

Table 5

Current and Improved Milk Production - Technical Parameters

Parameter	Current	Improved after 10 years
Milk/Cow/Year (kg)	860	1440
Milk/Cow/Day (kg)	4.0	6.0
Lactation Lenght (Days)	180	240
Calving (%)	60	75
Milk/Cow in the Herd (kg)	520	1100
Mortality (%)	20	5

It is seen that increased levels of production must be realised through improved levels of management aimed at increasing efficiency in the use of the available resources.

/...

These improved practices would be conducted to prolong lactation length, increase milk production/cow, calving percentages and stocking rate and decrease mortality. These changes can be obtained with the introduction of better practices in feeding systems, herd management, animal health, breeding and development of basic infrastructure on farms (calf, cow and milking pens and fencing).

Table 6 shows the projected production as a result of applying improved practices. These figures indicate that milk production self-sufficiency and zero powdered milk importation can be achieved after ten years of establishment of the programme for improving the actual dairy production systems in Suriname.

Table 6

Projected Production as a Result of the Introduction of Improved Practices

Districts	No. of Farms	Total Dairy Cows	1984 Actual Milk Production (kg) ('000) *	1989 Projected Milk Production (kg) ('000) **	1994 Projected Milk Production (kg) ('000) **
Para	310	2480	1200	2100	2700
Saramacca	343	1458	760	1250	1600
Suriname	2219	13314	6900	11450	14600
TOTAL	2772	17252***	8860	14800	18900
Milk Imports (Tons)			750	200	0

* Using the current technical parameters

** Using the improved technical parameters

*** No increase in the cattle population

Source: Survey Projection

c. Programme Components

The realization of the above changes is contingent upon the establishment of a production programme to improve the existing dairy systems in Suriname. Among the most important components of the programme are the following:

1) Strengthening of the Animal Health and Livestock Division of the Ministry of Agriculture so as to ensure:
   - Transfer of sound milk production technology to the farmers;
   - The availability and skill of resource personnel to support dairy development;
   - The supply of improved inputs and services available to farmers. These include breeding stock, improved grass and artificial insemination or bull service centres;
   - The conducting of applied research for the solution of problems arising in the sector;
   - The conducting of economic analysis detailing cost of production and domestic cost of milk production based on case studies.
2) The availability of credit to the farmers to finance the introduction of the improved practices.
3) Adequate policies on pricing and marketing to stimulate the development of the sector.
4) As milk production is expanded and improved, milk collection and distribution systems have to be investigated simultaneously with the expansion and improvement of the Milk Plant.

5) Establishment of a Dairy Development Board with the following specific responsibilities:

- To ensure collaboration and understanding among the different institutions (internal and external) impacting on the development of the sector;
- To organise dairy sector farmers in order to increase their participation in the national dairy programme;
- To monitor macro and micro factors affecting the the development of the dairy sector;
- To make recommendations for the generation of government policy for the promotion of the development of the dairy sector.

The introduction of improved management practices and strengthening of the institutional dairy sector will result in increased milk production/cow, milk production/cow in the herd, lengthening of the lactation period and increased calving percentage. These improvements in the dairy cattle population will contribute to the goal of the milk production programme of developing the capacity to replace imports, save foreign exchange and attain self-sufficiency in milk production in 1994.

d. Implementation of the Programme

The programme will be implemented over three years. The programme has three organisational phases which complement each other to put in place the process of milk production development. Each component of the programme generates several actions to be undertaken within the phases of the project. Chart 1 shows the phase diagram for implementing the milk sector programme.

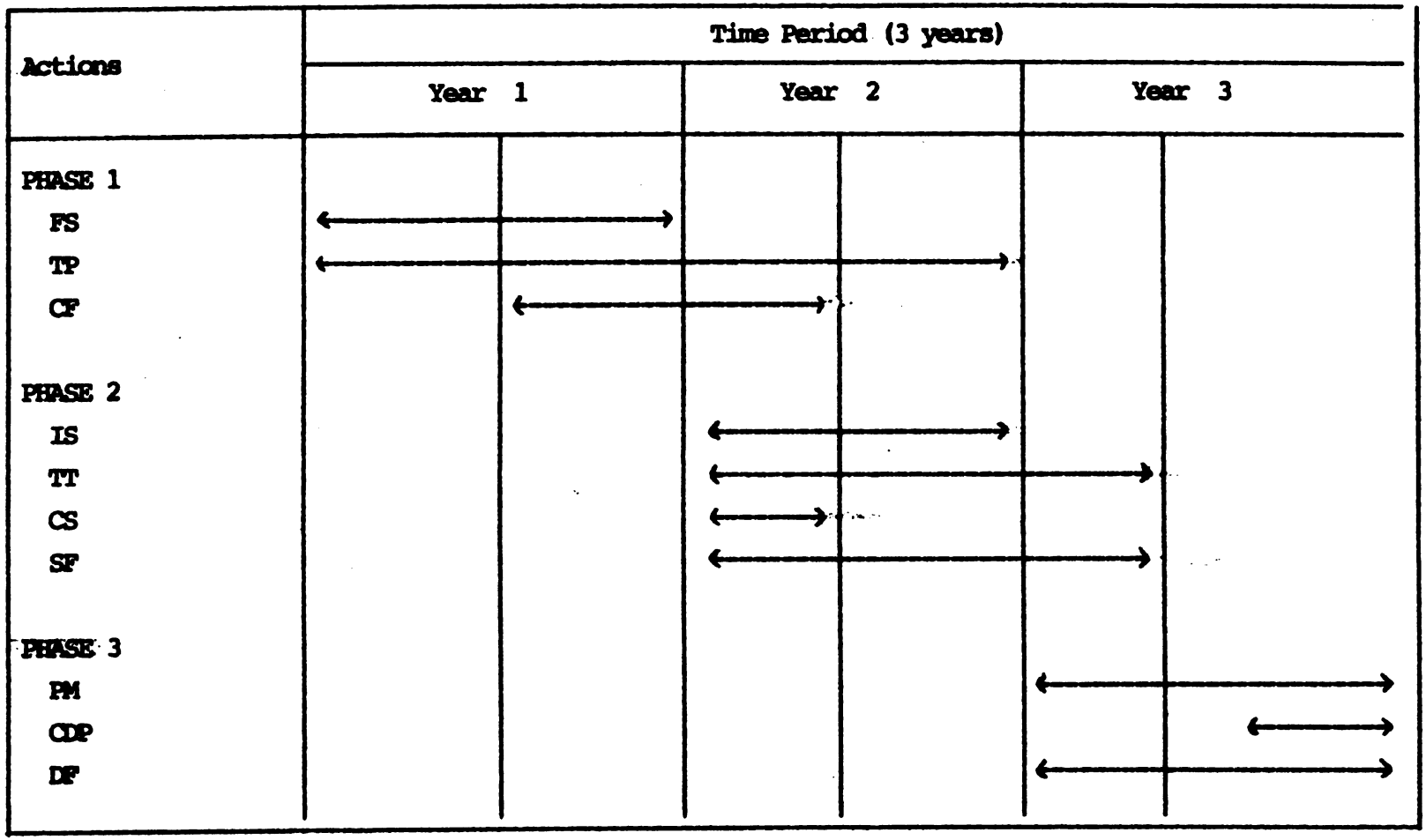
Phase 1

- Organise and complete a feasibility study (FS) which analyses and details a long-term programme for improving the existing dairy production systems and removing the constraints identified in the survey.
- Establish a training programme (TP) for increasing the availability and skill of resource personnel (technical and farmers) to support dairy development. Conferences, short courses and in-service training in the country will be the mechanisms to be used.
- Promote and increase the availability of credit to the farmers (CF) in order to finance the introduction of the improved practices.

Phase 2

- Organise the establishment of inputs and services (IS) available to farmers: Breeding stock, improved grasses and artificial insemination or bull service centres.
- Transfer sound milk production technology to farmers (TT).
- Conduct economic analysis detailing cost of production based on case studies (CS).
- Change the role of the state farm in order that it conducts applied research for the solution of problems arising in the sector (SF).

Chart 1: Phase Diagram for Implementing the Programme for Improving the Existing Dairy Production Systems in Suriname



Phase 3

- Establishment of policies on pricing and marketing (PM) that stimulate dairy development.
- Investigation of milk collection and distribution systems simultaneously with the expansion of the Milk Plant (COP).
- Organise dairy farmers (DF) to promote and give support to the dairy programme.

3.4.3. Summary and Conclusions

Thus, based on a feasibility study a Dairy Development Programme for implementation can be planned over a period of three years. The major activities would focus on strengthening and developing the milk supply subsector, the input and service support systems as well as the processing and marketing of milk. The main institutional improvement will be the expanding and strengthening of the Animal Health and Livestock Division of the Ministry of Agriculture. The successful application of such a programme would result in Suriname's achieving self-sufficiency in milk and milk products.

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ANNEX 1

CONTACTS ESTABLISHED

Frank Vreden	-	Minister of Agriculture
F.W. Van Amson	-	Permanent Secretary
J.J.M. Hooplot	-	Permanent Secretary
R. Lieuw-A-Joe	-	Deputy Director, Livestock and Agricultural Development
H. Lionarons	-	Planning Coordinator
C.H. Alvares	-	Director of State Farm
A. Tjong-A-Hung	-	Deputy Director, OAS/Suriname
T. McKenzie	-	Projects Director, OAS
G. Mora	-	Director, PAHO
Tjang-A-Fah	-	Veterinarian
Ma-A-Jong	-	Veterinarian
Hooghiemstra	-	Veterinarian
A. Moentari	-	Animal Feeding Specialist
P. Verbhoft	-	Grassland Specialist
J. Drielsma	-	Director of SEL
J. Drielsma Jr.	-	Manager, Baboenhol Parastatal Farm
H. Rosenblad	-	Sub-Manager, Baboenhol Parastatal Farm
J. Soeleball	-	Sub-Manager, Tibiti Parastatal Farm
H. Abrahams	-	Director, Milk Plant
G. Villanueva	-	Director, IICA/Suriname
F. Mulhern	-	Director, IICA Animal Health Programme
F. Alexander	-	Director, IICA/Guyana
D. Ford	-	Farm Management Specialist, IICA/Guyana
H. Muñoz	-	Animal Production Specialist, IICA/Guyana

ANNEX 2

DAIRY FARM SURVEY QUESTIONNAIRE

1. GENERAL FARM INFORMATION

1.1 Size of Farm _____ ha. No. of plots _____

1.2 How is your farm land owned?

Address	Title	Plot Size

1.3 What is the distance of your farm from Paramaribo? _____ km

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

_____ years

1.5 What is the topography of your land? _____ % Highland

_____ % Lowland

1.6 What is the soil type of your land?

Soil type	of land %
Clay	
Sand	

1.7 Does your farm have an irrigation system? _____ (yes/no)

Describe _____

_____

_____

1.8 Does your farm have a drainage system _____ (yes/no)

Does your drainage system function properly? _____ (yes/no)

Is it possible to connect your drainage system with a primary canal system? _____ (yes/no)

Does the primary canal system function properly? _____(yes/no)

2. FARM RESOURCES

2.1 How is your land utilized?

Use of Land	Specie/Type
Nature grasses	
Improved grasses	
Cutting grasses	
Plantaines	
Vegetables	
Rootcrops	
Fruitcrops	
Unutilized	

2.2 Describe your housing and production infrastructure

Type	No.	Size (m^2)	Type of Material	Age
House				
Barn				
Cow Pen				
Calf Pen				
Bull Pen				
Fence				

2.3 Describe the machinery and equipment you own

Item	No.	Brand/Size	Age
Tractor			
Small Motorcycle			
Jeep or Car			
Pick Up			
Trailer			
Plough			
Harrow			
Water Pump			
Spray Pump			
Milking Machine			
Other			

2.4 What livestock do you own?

Livestock	No.	Breed
Cattle		
Sheep		
Goats		
Pigs		
Poultry		
Horses		
Donkeys		
Mules		
Other		

3. PRODUCTION SYSTEMS

3.1 Describe your production system generally

_____ Dairy only

_____ Dairy/Beef

_____ Beef/Dairy

_____ Dairy/Other Describe _____

_____

_____

3.2 Describe your production system in detail

Cattle	No.of Head	Type & Amount of Feed per day per cat.	Mortality per year	Sales per year
Bulls				
Lactating cows				
Breeding cows				
Dry cows				
Heifers 2-3 yrs				
Heifers 1-2 yrs				
Calves (1 yr)				

What is the basic feed for your cattle?

Grazing _____

Grazing and Concenstrates _____

Cutting grass _____

Cutting grass and Concenstrates _____

Molasses _____

Other byproducts _____

How much milk do you average per milking cow/day _____ kg

What is the average total milk production per day? _____ kg

How do you dispose of your milk? _____ Milk Plant

_____ Sale to other _____ Home use

_____ Other Livestock

What is the average lactation length of your milking cows?

_____ days

3.3 How do you manage your Pastures?

Zerograzing _____

Intensive _____

Extensive _____

No. of Pasture Divisions _____ Size _____ hec

Grazing Period (No. of Days) _____

Resting Period (No. of Days) _____

No. of hrs cattle grazed on pasture daily _____ hrs

Amount of fertilizer applied to pasture:

Chemical _____ kg/ha Organic _____ kg/ha None ___

How is the cleaning and weeding of pasture done?

- By Hand _____ - By Machine _____

- By Chemicals (State Type)_____

- Type of fences (Describe) _____

_____

Describe maintenance done to fences each year _____

_____

_____

3.4 HERD MANAGEMENT

3.4.1 Do you have animals identified? _____

What system do you use? _____

_____

_____

3.4.2 Is your cattle managed in separate categories? _____ (yes/no)

Which ones?

Cows in production _____ Dry Cows _____

Heifers _____ Calves _____

Other Categories _____

_____

_____

3.4.3 Which system do you use to breed your female cattle?

Natural: On Hand _____ Pasture _____

Artificial Insemination _____

Who renders A.I. Service? State _____ Private _____

At what age do you breed your heifers? _____ yrs

3.4.4 Do you have a breeding season? (Describe) _____

_____

_____

3.4.5 How many days after calving do you breed your milking cows?

_____ Days

3.4.6 Do you have a special place for cows to calve?

_____ Pasture _____ Pen

3.4.7 At what age do you wean your calves? _____ Months

3.4.8 Do you milk once or twice a day? _____

Hand _____ Machine _____

3.4.9 What are your milking hours? _____ am _____pm

3.4.10 Do you milk cows in the presence of calves? _____

3.4.11 How much milk do you give to the calf? _____ kg/day

3.4.12 How long does the calf remain with the mother after milking time? _____ hrs

3.4.13 Do you have a special place for milking your cows? Describe:

_____

_____

3.4.14 Do you supply your animals with fresh water?_____

In what and where? _____

How much? _____

3.4.15 Do you have a milking machine? _____

_____

Would you like to have a milking machine? _____

_____

4. ANIMAL HEALTH

4.1 The Calf: How many calves are born this year? _____

_____ each year _____ on average

How many calves have died this year? _____

At what age did they die? At birth _____

3rd week _____ Older _____

4.2 What do you think caused the deaths? Still births _____

Weak or Deformed calves _____

Accident or Trauma _____ Infection (D1P2) _____

Screwworm _____ Parasites _____

4.3 Do you examine the calf after birth? _____

What type of treatment do you give to the calf after birth?

Navel Treatment _____ Iodine _____

Screwworm Spray _____

Treatment: Antibiotics _____

Vitamins Supplements _____

Other _____

4.4 What is your biggest problem with calves? _____

_____

_____

_____

4.5 Do you treat calves for internal parasites? _____

At what age do you start treatment? _____

How many times per year? _____

What type of worms do you think they have?

Roundworms _____ Tapeworms _____

Lungworms _____

4.6 What is your favourite worm medicine? _____

4.7 What is your biggest problem with cows? _____

_____

_____

4.8 Do you have trouble with cows at calving? _____

Do you have to pull the calf? _____ How many? _____

Do cows retain the afterbirth? _____ How many? _____

Do cows show infection after calving? ____ How many? _____

4.9 What treatment do you give to the cow after calving?

Cleansing Drench (Internal and/or External) _____

Antibiotics _____ Other _____

_____

_____

4.10 Milking: Do you clean the udder and teats before milking?____

_____

Do you test the milk for mastitis? _____

Do you treat teats after milking? _____

What do you use? _____

4.11 How many cows get mastitis? _____ Cows

How many cows get blocked teats? _____

What causes blocked teats (Mastitis, Cut teats, Trauma,

Born so) _____

Do cows resent milking? _____

4.12 Do you vaccinate your cattle? _____ Against what?

Rabies _____ Brucellosis _____ Other _____

Frequency _____

4.13 Do you spray your cattle against ticks? _____

How frequently? _____

What do you use? _____

Do you consider your control effective? _____

4.14 Do you treat your cows for internal parasites? _____

4.15 What parasites do you think they have? _____

What medicine do you use? _____

4.16 Do you use the veterinarian? _____

How frequently? _____

_____

Have any of your cattle died recently? _____

What was the cause of death? _____

_____

_____

4.17 What are the main reasons for culling cattle?

Unthrifty _____ Low Production _____

Will not breed _____ Other _____

Do you think you have a problem getting your cows pregnant? __

_____

How about your Heifers? _____

4.18 Do you buy cows? _____ How many in last 2 years? _____

Do you examine or have them tested beforehand? _____

For what? _____Pregnancy _____ Other

Have your animals been tested for: (Blood tests)

- Tuberculosis _____
- Brucellosis (Abortions) _____
- Leptospirosis _____

5. MEMBER MANAGEMENT

5.1

Family Members	Sex	Age	Education	do they work on the farm	duties	hrs/day	do they work off the farm	part time or full time

/...

5.2 Do you hire labour? _____ yes/no

	Permanent	Temporary
No		
Duties		
Days/wk		
Wage/day		

6. What kind of records do you keep?

Type	Describe
Production	
Labour	
Economics	
Other	

7. What other farm produce have you sold this year?

Type	Amount
Sheep	
Goats	
Pigs	
Chickens	
Horses	
Other Livestock	
Rice	

What other farm produce have you sold this year? (continued)

Type	Amount
Plantains	
Ground provisions	
Root crops	
Vegetables	
Fruits	
Other Crops	

8. STATE AND PRIVATE SERVICES AND TECHNICAL ASSISTANCE

8.1 Do you receive services and technical assistance? _____ yes/no

From which source? State _____ Private _____

8.2 What type of services or technical assistance do you receive?

Agency	Purpose	Time/Year	Costs

8.3 What do you have to do to obtain the service and technical assistance?

_____

_____

_____

/...

9. CREDIT

9.1 Do you use credit? _____

_____

_____

9.2 How much credit have you received in the past?

Year	Purpose	Source	Amount	Int. Rate	Yrs.	Guarantee

9.3 Do you have any comments on the bank credit? (Need, difficulty obtaining, etc.) _____

_____

_____

10. What are the major problems on your farm?

_____

_____

Feed _____

Inputs _____

Management _____

Health _____

Breeding _____

Techn. Assist. _____

Prices and Marketing _____

Drainage/Irrigation _____

Any other problems _____

_____

11. FARM IMPROVEMENTS

11.1 Do you want to improve your farm and farm production? _____

_____

What type of changes you wish to make? _____

_____

_____

_____

If the answer is NO, what are your main reasons? _____

_____

_____

_____

11.2 Among the dairy farmers you know, which of them do you consider to be good cattle farmers and why? _____

_____

_____

_____

/...

12. SURVEYOR'S COMMENTS

	Bad	Good	Very Good	Excellent
Farm Potential				
Farm Characteristics				
Farm Leadership				
Farmer's Interest				
Farm Access				

Other Comments _____

_____

_____

_____

13. Surveyor, please be sure to translate your written word responses to this questionnaire into english, either on the sheet or attach a sheet numbered relevantly.

14. List Name of farmer and address below and write at the front of the questionnaire after interview.

ANNEX 3

SURVEY PERSONNEL

H. Ladicnois	-	Agricultural Economist
A. Van Capelle	-	Agricultural Economist
D. Rambaran	-	Statistician
G.K.L. Chin	-	Head of Statistics Division
C.A. Alvares	-	Surveyor
W. Atmowirono	-	Surveyor
B. Ramdien	-	Surveyor
S. Changoe	-	Surveyor
A. Stirling	-	Surveyor
R. Kalloe	-	Surveyor
F.K. Bardan	-	Surveyor
E.M. Lachman	-	Surveyor
A. Choen	-	Surveyor
J.Y. Daly	-	Surveyor
S. Jiawan	-	Surveyor