04/0050/37

นิพนธ์ต้นฉบับ

Control of Reproductive Disorder and Monitoring of Herd Health Programme for Improvement of Dairy Production in Thailand
I. Survey of Data Base of Dairy Farming at Ratchaburi and Nakhon Pathom*

การจัดการระบบสืบพันธุ์และโปรแกรมการติดตามสุขภาพของโคนม เพื่อปรับปรุงการผลิตน้ำนมในประเทศไทย
1. การสำรวจข้อมูลพื้นฐานเกี่ยวกับโคนมที่เลี้ยงบริเวณจังหวัดราชบุรีและนครปฐม

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บทคัดย่อ : ญอน มารี ฮัมแบร์ต, พีระศักดิ์ จันทร์ประทีป, สัมพันธ์ สิงหจันทร์, พรรณพิไล เสกสิทธิ์, ประเสริฐ ศงสะเสน, ชัยณรงค์ โลหชิต, โนเอล ชาเบอฟ, สมสวย ศุภรัตนาวงศ์, และ โดมินิก พล็องชโน. 2533. การจัดการระบบสืบพันธุ์และโปรแกรมการติดตามสุขภาพของโคนม เพื่อปรับปรุงการผลิตน้ำนมในประเทศไทย 1. การสำรวจข้อมูลพื้นฐานเกี่ยวกับโคนมที่เลี้ยงบริเวณจังหวัดราชบุรีและนครปฐม. วารสารวิจัยวิทยาศาสตร์การแพทย์ 4(1) : 11-32

การเลี้ยงโคนมในบ้านเราได้รับการพัฒนาด้วยการผสมเทียม ตั้งแต่ปี พ.ศ. 2499 แต่มีปัญหาหลายประการที่ยังมิได้มีการศึกษาเพื่อวางแผนแก้ไข หรือป้องกันอย่างเป็นระบบ ทั้งนี้เพราะยังขาดข้อมูลพื้นฐาน การศึกษาครั้งนี้เพื่อหาข้อมูลพื้นฐานโดยสุ่มเลือก 20% ของฟาร์มทั้งหมด ซึ่งจะได้ประมาณ 294 ฟาร์ม จำนวนโคนมทั้งแม่โคและโคสาวที่ผ่านการ

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01/0050/33

ผสมเทียมมาแล้วอย่างน้อยหนึ่งครั้งรวม 2,289 ตัวจากจังหวัดราชบุรีและนครปฐม ใช้แบบสอบถาม 3 แบบ (ข้อมูลทั้งหมดได้จากเจ้าของฟาร์ม) แบบที่ 1 ข้อมูลรายละเอียดเกี่ยวกับฟาร์ม ได้แก่ สถานภาพของฟาร์ม เนื้อที่ของฟาร์มที่ใช้ ปศุสัตว์ที่เลี้ยงอาหารและการให้อาหาร การผสมพันธุ์ โรงเรือนและผลผลิตที่ได้ แบบที่ 2 รายละเอียดของฟาร์มเกี่ยวกับสายพันธุ์แบ่งโคตามอายุและเพศตลอดจนแหล่งที่มาและการนำไปใช้ประโยชน์ แบบที่ 3 รายละเอียดเกี่ยวกับโคแต่ละตัว รวมถึงสมรรถภาพทางการสืบพันธุ์ ซึ่งได้แก่ fertility rate, fecundity rate, prolificity rate และอัตราการแห้งลูก พร้อมกันนี้ทำการเจาะเลือดโคทุกตัว เพื่อใช้ตรวจโรคทางเซโรโลยี ตรวจทางโลหิตวิทยา และโรคพยาธิในเลือด แล้วนำข้อมูลที่ได้ไปวิเคราะห์ได้ผลต่าง ๆ ที่ชี้ให้เห็นถึงลักษณะของฟาร์ม สถานภาพของสมรรถภาพการสืบพันธุ์ และปัจจัยที่เข้ามาเกี่ยวข้อง ซึ่งนำไปใช้ให้เป็นประโยชน์ในการศึกษาช่วงต่อไป

คำสำคัญ : *ความผิดปกติของการแพร่ขยายพันธุ์ ; การสำรวจด้านสุขภาพ ; การเลี้ยงวัวนม ; ราชบุรี ; นครปฐม*

Abstract : **Jean Dominique Marie Humbert, Peerasak Chantaraprateep, Samphan Singhajan, Panpilai Sekasiddhi, Prasert Songsasen, Chainarong Lohachit, Noel Chabeuf, Somsuay Suparattanawong, and Dominique Planchenault. 1990. Control of reproductive disorder and monitoring of herd health programme for improvement of dairy production in Thailand. 1. Survey of data base of dairy farming at Ratchaburi and Nakhon Pathom. Thai J Hlth Resch 4(1) : 11-32**

Artificial insemination has helped improving dairy cattle in Thailand since 1956. However, several problems remain to be investigated then solving and prevention can not be made due to lack of data base. The present study was aimed at using questionaire to survey data base of dairy farming and factors involved in Ratchaburi and Nakhon Pathom provinces. Stratified sampling was performed, 20% of the target populations was chosen, 294 farms and 2, 289 heads of dairy cow including heifers which had been inseminated at least once. Three forms of questionaires were used, the first one was general characteristic of the farm to be questioned, it dealed with rearing system, feed and feeding, reproduction and pathology. The second form was about the composition of the herd as a whole including condition of individual animal. And the third one dealed with breeding record of each individual cow and heifer and fertility, fecundity, prolificity and abortion rate were computed. In addition, 2 blood samples were collected from each cow, one for serology survey of reproductive diseases, the other blood sample was investigated for haematology and blood parasites. All the data were computerized, the findings revealed characteristic of dairy farming, reproductive performance, etc. which will be very beneficial for further investigation.

Key words : *Reproduction, disorder ; Health, surveys ; Dairying, cow ; Ratchaburi ; Nakhon Pathom*

Introduction

In 1987, the population of dairy cattle in Thailand was around 72,000 heads. They concentrated mainly (60,000 heads) in the central part of the country. Statistics from 1982 to 1986 revealed an average growth rate of 20%. Milk production was 200 tons per day or 69,000 tons per year which was accounted to be about 14% of domestic demand. This in turn causes the country to import dairy products valued US$ 96 millions annually with the tendency to increase. Five year interval forecast of annual demand and supply of milk and milk products (in tons) of Thailand can be drawn as follow: in 1992, demand and supply were 608,209 and 155,929 an increase of 26% and in 1997 they were 690,275 and 327,505 an increase of 47%.

About 80 km south of Bangkok where Nong Pho subdistrict Ratchaburi province is situated. It is the centre for dairy production for small holder farmers since 1959. They benefit artificial insemination (AI) services from the Centre of Research in AI, Division of AI, Department of Livestock Development. At present, this Centre achives the most successful performance in the country. There are around 3,693 registered members, most of them are small holder farmers and formed a cooperative since 1975. It produces fresh milk 80 tons per day from about 10,000 cows. The population of the dairy cows here are around 17,000 heads most of them are crossbred (75% Holstein Frisien and 25% local breed).

All AI work done are noted in the card, a few analysis which have been carried out previously indicated the problem of low fertility and problem of repeat breeder cows. These problems cause heavy economic lost for the farmers.

The aim of the present research was to investigate the infertility problem of the dairy cattle in this area. A protocol was drafted between Department of Obstetrics, Gynaecology and Reproduction, Faculty of Veterinary Science, Chulalongkorn University, I.E.M.V.T. and Division of AI. It composed of 2 phases, a survey of general characteristic of dairy farms using questionnaires was assigned for the first phase. While for the second phase, a follow up programme of fertility for each individual cow was conducted. This report was the results of the first phase.

Materials and Methods

1. Adaptation of the method used

The method of survey using questionnaire was those proposed by zootechnique section of I.E.M.V.T. which has been tested in many countries. Three forms were used, the green one was for "state of the herd", the white for "the composition of the herd" and the yellow one was for "individual performance". A period of 2 months is necessary for adaptation of the 3 questionnaires according to particular objective of the survey.

2. Date and site of the operation

The survey was carried out during October 17, 1986 to January 27, 1987 and was in collaboration with personnels belonged to the Centre for Research in AI of Nong Pho (veterinarians and inseminators) and staff members of the Department of Obstetrics, Gynaecology and Reproduction (OGR) Faculty of Veterinary Science, Chulalongkorn University. Two hundred and ninety four farms were randomly selected, it was about 20% of the total farm which were subjected to question. The composition of the population were 63.6% (187 farms) in Photharam district, 20.1% (59 farms) in Ban Pong district, 8.5% (25 farms) in Ban Pae district and 7.8% (23 farms) in Muang District, Nakhon Pathom (see figure 1).

GENERAL CHARACTERISTICS OF THE FARM No.

LOCATION

District.....Subdistrict.....Village.....Distance from AI Centre.....km.

SITUATION

Member No.....
Name.....
Age.....
No. of family member.....persons
Working force :
Male.....
Female.....
Occuption :
Paddy, Plantation ☐
Animal Keeping ☐
Aquaculture ☐
Commerce ☐
Others.....
No. of salary person.....

FEED

Paragrass Yes ☐ No ☐
Corn stem Yes ☐ No ☐
Fresh baby corn waste Yes ☐ No ☐
Concentrate Yes ☐ No ☐
Lactation Yes ☐ No ☐
Dry period Yes ☐ No ☐
Home mixing : Yes ☐ No ☐
Ingredients
Cassava ☐ Bran ☐
Corn ☐ Broken rice ☐
Sugar ☐ Ag wast ☐

Conc. bought ☐ No ☐
Minerals ☐ No ☐
Year round ☐ Intermittent ☐ No ☐

LAND USED

Total area.....rai (2.5 rai = 1 acre)
Plantation.....rai
Paddy.....rai
Pasture.....rai
Others Y ☐ N ☐

ANIMALS

Bovine..... heads
Native.....
Crossbred.....
Buffalo ☐
Pig ☐
Poultry ☐

REPRODUCTION

AI only ☐ bull ☐
Bull calf (>1y) Y ☐ N ☐
Heat detection :
M ☐ N ☐ E ☐ convenient ☐
Disease outbreak :
Infectious d. Y ☐ N ☐
Reprod. d. Y ☐ N ☐

HOUSING

Housing : Under the house ☐
Separated ☐
Roof : Thatch ☐
Corrugated
galvanize roof ☐
Floor : Soil ☐
Cement ☐

PRODUCT

Milking cow.....heads
Milk production/day.....kg

Milkings/day.....time

Surveyer..... Date.....

CONDITION OF THE HERD

Running No.....
Member No.....

Condition of animal : F : fat T : thin N : normal
Mucous membrane (MM) : P : pale Y : yellow N : normal
Uterus : N : normal, RFM : retained placenta, M : metritis
Mammary gland : N : normal, INF : inflammation, Bl : Blind

	Breed	Name	Sex	Age	Origion	No of calves	Utilization	Condition	MM	Uterus	Mam.g
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

Researcher..... Date.....

INDIVIDUAL PERFORMANCE

No.....

Member No.....

Breed.....Name.....No.....

Age.....years Total calves.....(included abortion)

Age	Calving (+abortion)		Calf 1				Calf 2 (twinning)			
	No.	Date	Sex	Alive	Present cond.	Age	Sex	Alive	Present cond.	Age
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15+										

Researcher..... Date.....

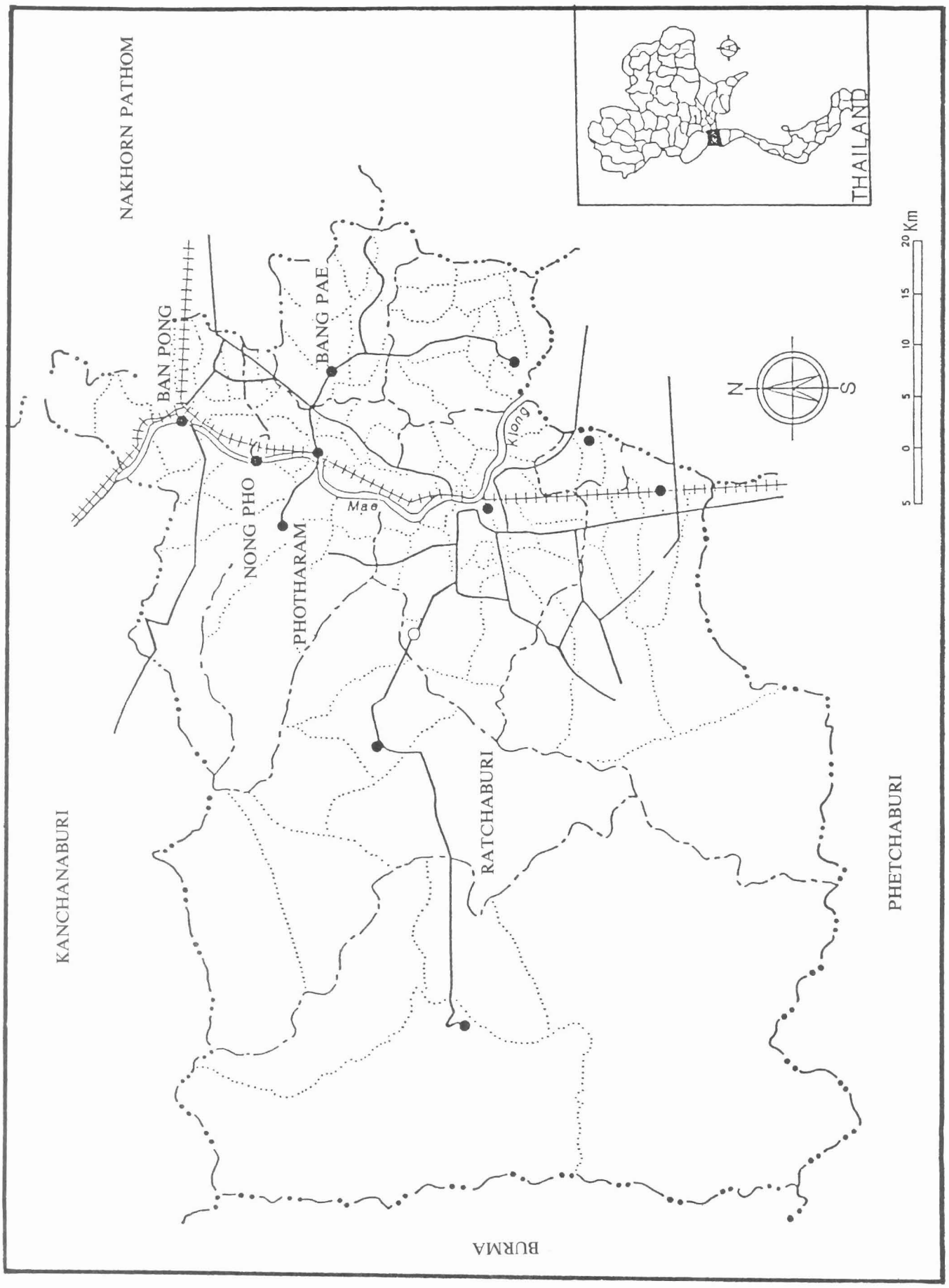


Figure 1. Map of the localization of the survey.

All together, 4 districts, 13 subdistricts and 57 villages were involved in this survey as shown in table 1.

Table 1. *Distribution of herds surveyed by districts and subdistricts.*

District	Subdistrict	No. of herd
1. Photharam	Nong Pho	102
	Don Krabuang	43
	Ban Luak	25
	Ban Singh	9
	Don Sai	5
	Ban Kong	2
	Klong Ta Kod	1
Sub total		**187**
2. Ban Pong	Don Krabuang	31
	Nong Oor	20
	Suan Kloy	6
	Nong Gob	1
	Nong Din Daeng	1
Sub total		**59**
3. Ban Pae	Wang Yen	20
	Bang Pae	2
	Don Yai	2
	Wat Kaew	1
Sub total		**25**
4. Muang, Nakhon Pathom	Suan Pan	17
	Sra Kratium	6
Sub total		**23**
Total		**294**

3. Results of the survey

3.1 Situation of the farmers

3.1.1 Age

Average age of the farmers was 45 years, the youngest and oldest were 21 and 81 years old respectively. The distribution was as follow, 26.6% was less than 35 years, 39.3% was between 35 and 50 years and 34.1% was older than 50 years.

3.1.2 Number of family members

On average there were 6 persons per family those who have more than 8 persons were rare, only 5.1% (table 2 and diagram 1, 2 & 3).

Table 2. *Distribution of personnels and working population.*

Type	Mean (± SD)	Minimum	Maximum
No. of family members	5.6 ± 2.2	2	14
No. of working male	1.6 ± 0.8	1	5
No. of working female	1.1 ± 1.1	1	7

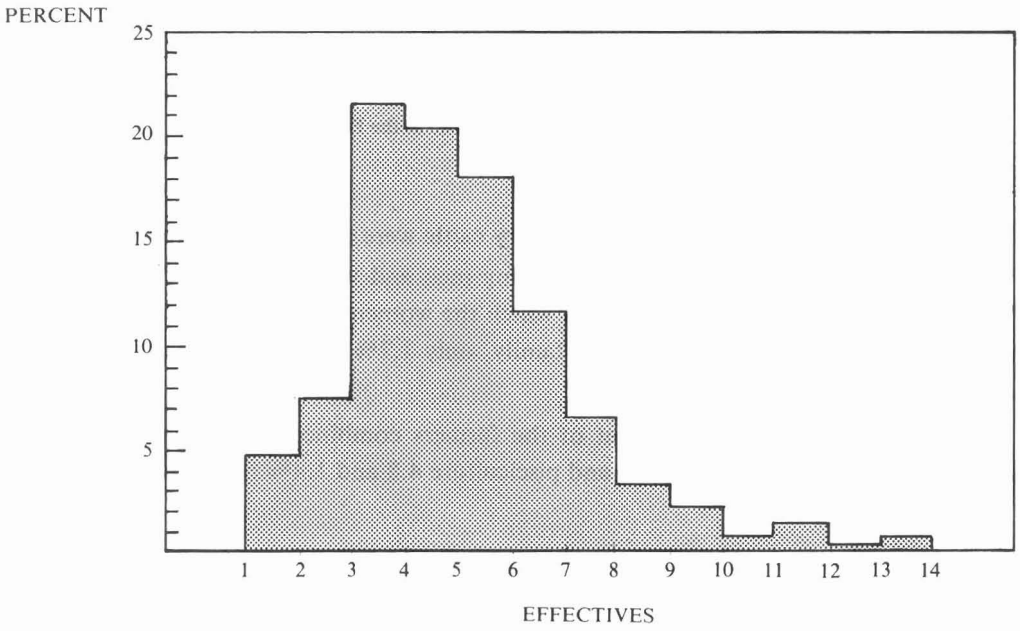


Diagram 1. Number of Persons of the Family.

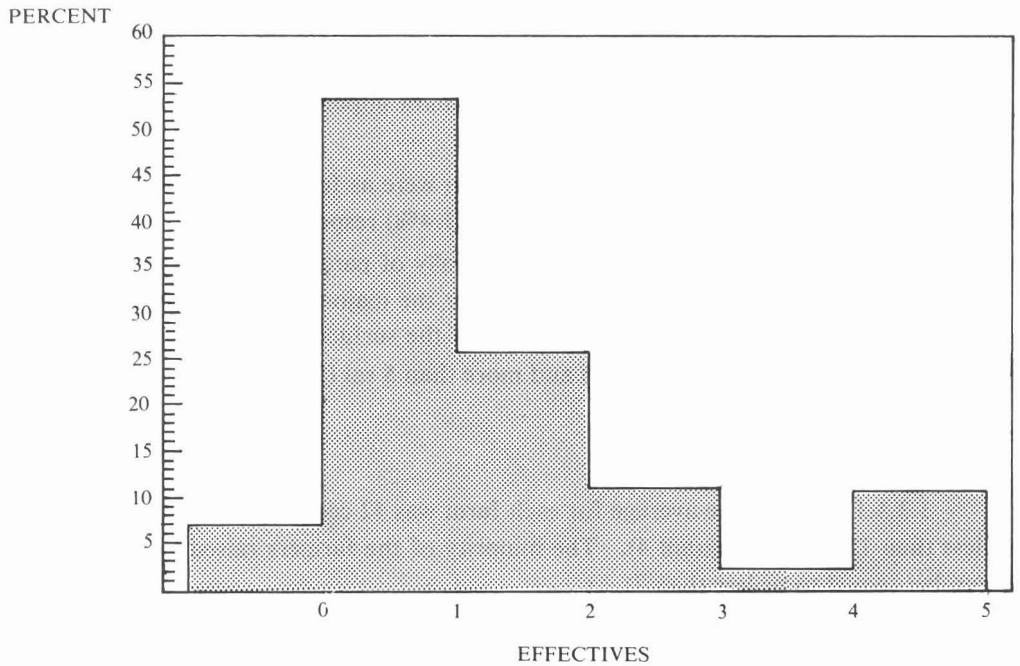


Diagram 2. Number of Working Males in the Farm.

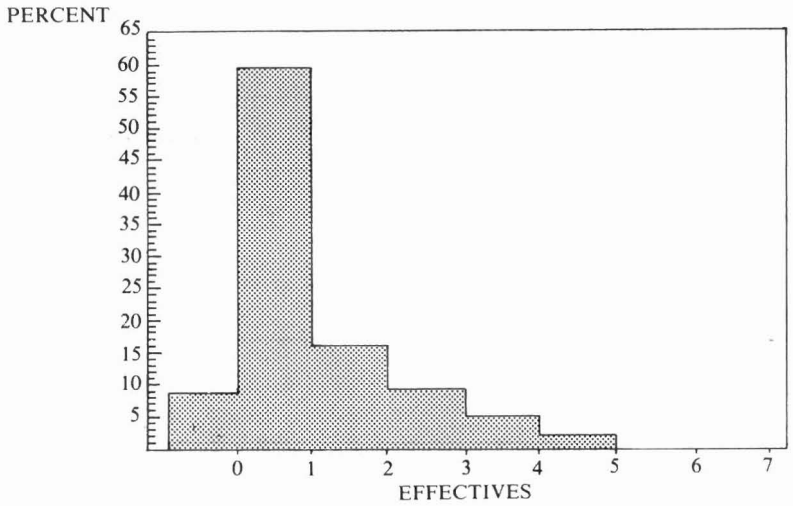


Diagram 3. Number of Working Females in the Farm.

3.1.3 Number of working person

All persons who took care of the dairy cattle were considered as working person.

A similar distribution of both working men and women. Six point eight per cent of the farms did not employ men and 8.5% of them of which the women did not take care of the animal. Majority of the working persons were members of the family, only 1.7% of the farms employed workers.

3.1.4 Activities

Seventy point seven per cent of the farmers combined activities of dairy farming with cultivation. Other activities were commercial and pisciculture 4.8 and 1.4% respectively.

3.2 Operation

3.2.1 Distance from the Centre of AI (C.A.I.)

All the farms surveyed were within the radius of 40 km from the Centre of AI, on average the distance was 4.2 km. Forty two point three per cent were situated less than 2 km, 36.5% were between 2 and 5 km and only 21.2% of the farms were farther than 5 km from the Centre of AI.

3.2.2. Surface area

3.2.2.1 Total surface

Average surface area of the operation was 11.6 rai*

3.2.2.2 Cultivation

Paddy field, rice cultivation is the most important and accounted to be 59.7% of the farmers who raised dairy cattle.

On average the paddy field was 6.5 rai, their distribution were as followed 0 (40%), 1 to 5 (19%), 6 to 10 (20%), 11 to 20 (14%), 21 to 30 (5%) and more than 30 (1.4%) respectively.

On average the surface area for forage cultivation (essentially of para grass) was 2 rai. It was noted that 22% of the farmers don't have any forage cultivation and for the majority of them (94.9%) the surface area for cultivation was not more than 5 rai. The distribution of the surface for forage cultivation were as followed 0 (22%), 1 to 2 rai (44.7%), 3 to 5 rai (28%) and more than 5 rai (5.3%).

3.3 Livestock

3.3.1 Size

3.3.1.1 Bovine, the average for each farm was 12 cows. The majority of the farms (78.5%) possessed less than 15 heads (diagram 4). The minority of the farmers raised local breed (4.8%) normally in small number (equal to or less than 7).

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* *2.5 rai = 1 acre*
2.471 acres = 1 hectare
= 100 ares

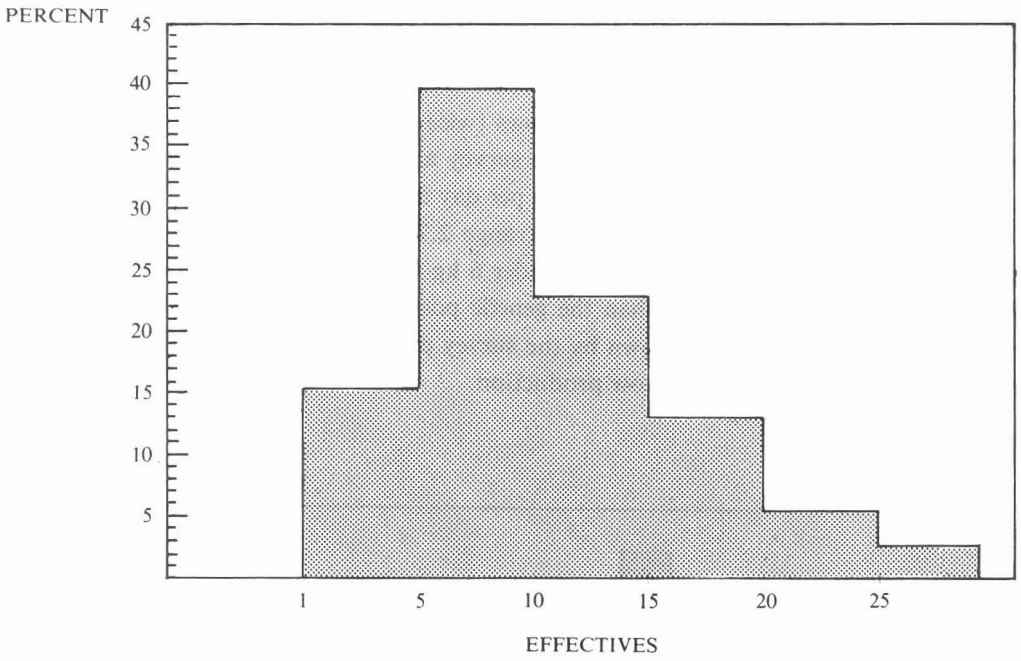


Diagram 4. Number of Dairy Cows per Farm.

3.3.1.2 Other species

Seventy one point seven and 44.4% of the farmers possessed poultry and pigs respectively. Most of them were family business as the size of poultry did not exceed 30 heads (5.8% of farms) and the pigs were 5 heads (8.5% of the farms interrogated). Not a single farmer possessed buffalo.

3.4 Rearing system

3.4.1 Cow-shed

Only 13.7% of the cow-shed was traditional built, the animals were raised under the house. Majority of the cow sheds were separated from the houses, having cement floor 97.6%, the corrugated galvanize roof 66.3% and straw 33.7%.

3.4.2 Feeding

3.4.2.1 Green grass

The questionnaires on the green grass distributed on the day of survey was recorded. Most of farmers gave paragrass (8.2%) to their animals or stem and leaves of the maize (71%), minority of them (36%) distributed the shuck of maize.

3.4.2.2 Feed and minerals supplement

All the farmers gave concentrate to their animals, however only 36% of them gave during the dry period which means that 64% of the farmers surveyed did not prepare their cows for the calving by giving the feed. Generally the concentrate was bought, only 3.4% of the farmers mixed the feed themselves.

Minerals supplement was not distributed all year round excepted for 17.7% of the farms and 32% of the farmers did not give any mineral supplement in the ration.

3.4.2.3 Heat detection and AI

Heat detection was practiced several times a day for 53.1% of the farms surveyed while for 41.2% of them observed only once in the morning.

Ninety point four per cent of the farmers used AI, another 9.6% used occasionally natural service, only 4.9% possessed the bulls.

The problem of repeat breeding (more than 3 AI per conception) were frequent, up to 53.3% of the farms surveyed.

3.4.2.4 Milk production

All farmers milked their cows twice daily. For each farmer he was asked about the number of cows milked the previous day of the survey and the milk yield (kg) produced which allowed us to calculate the average production of each cow per day during the lactation.

On average it was 8.1 kg (range 2.7 to 16.7 kg). Twenty one point four per cent of the farms, average milk yield/cow/day was under 6 kg while only 17.2% produced more than 10 kg (diagram 5). Milk production was lower than the genetic potential of the Holstein-Frisian crossbred. Certain improper practice of management as shown by the survey particularly irregular distribution of the concentrate and minerals can partly explain this low production.

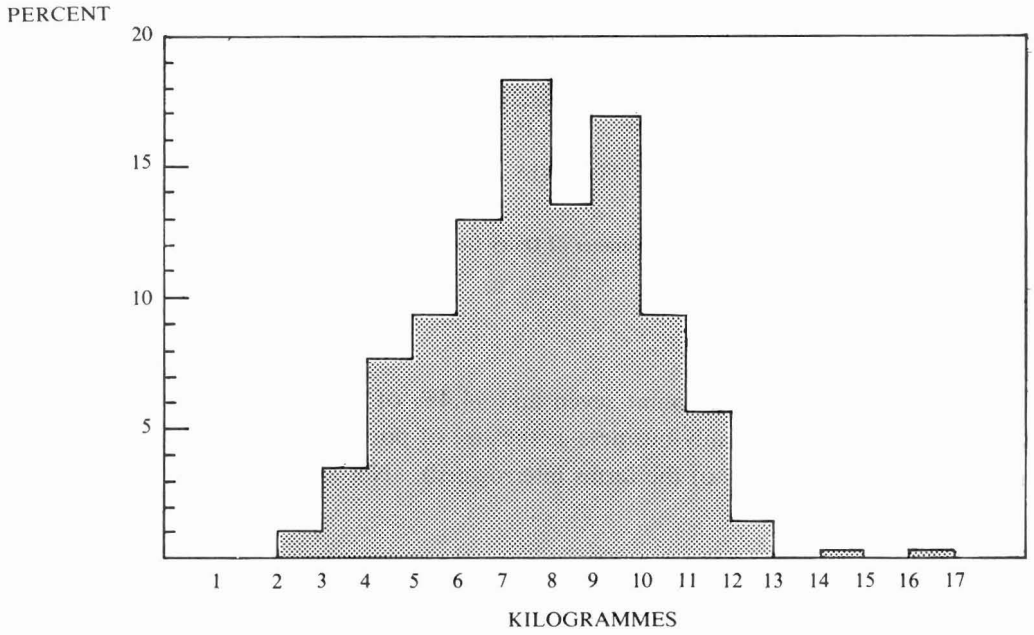


Diagram 5. Milk Production.

3.5 Parameters of the herds

3.5.1. General composition of the herds

3.5.1.1 Distribution by breed

The herds were crossbred Holstein-Fresian (represented 97.9% of the herd inquired). The percentage of the exotic blood were mostly 75%.

Other breeds encountered were Australian Illawara Shorthorn, Brown Swiss and Red Dane.

3.5.1.2 Distribution by age group

Table 3 revealed the distribution of animals by age group. There was a big difference between the number of the males and females due to the fact that 76.3 per cent of the males produced were sold between birth and 1 year old compared to 6.9% for the females during the same period. Thus, the herds were composed of mostly females (90.8%) while for the males they were only 9.2% of the productive animals.

Only a pyramid of the ages of the females can be drawn. It revealed classically, a decreased growth observed from one group to another with perhaps a culling around the age of 7-8 years.

Table 3. *Distribution of animals by age group.*

Age group (years)	Male				Female		Total	
	No.	M	Total	%	No.	%		%
0 - 1	282		282	8.4	600	17.9	882	26.3
〉 1 - 2	14		14	0.4	415	12.3	429	12.7
〉 2 - 3	2		2	0.06	414	12.3	416	12.4
〉 3 - 4	5		5	0.1	363	10.8	368	10.9
〉 4 - 5					290	8.6	290	8.6
〉 5 - 6	3		3	0.09	261	7.8	264	7.9
〉 6 - 7					234	6.9	234	6.9
〉 7 - 8					135	4.0	135	4.0
〉 8 - 9					104	3.1	104	3.1
〉 9 - 10	1		1	0.03	95	2.8	96	2.9
〉 10 - 11	2	1	3	0.09	52	1.6	55	1.7
〉 11 - 12					26	0.8	26	0.8
〉 12 - 13					19	0.5	19	0.5
〉 13 - 14					22	0.7	22	0.7
〉 14 - 15					9	0.3	9	0.3
〉 15 - 16					5	0.1	5	0.1
〉 16 - 17					2	0.06	2	0.06
〉 17					6	0.2	6	0.2
Total	**309**	**1**	**310**	**9.2**	**3052**	**90.8**	**3362**	**100.0**

M = Castrated male

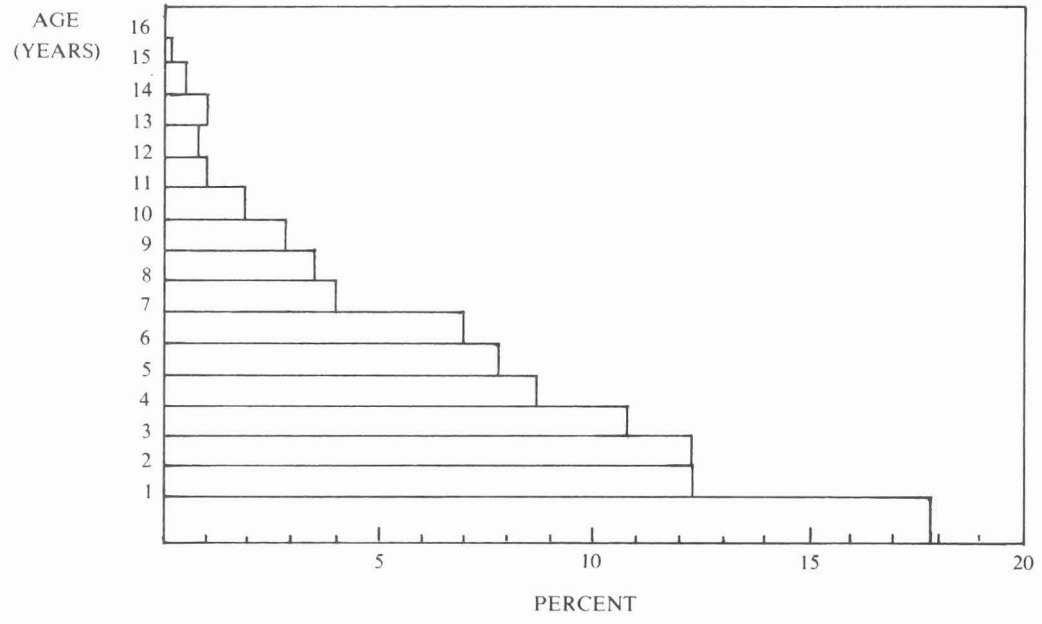


Diagram 6. Pyramid of Age of Female Animals.

3.5.1.3 Origin and utilization

As shown in table 4, majority of animals were born in the farm, the females were kept for milk production and the males, sold.

Table 4. *Origin and utilization of animals*

		Male		Female		Total	
		N	%	N	%	N	%
ORIGIN	Born	283	8.4	2,142	63.7	2,425	72.1
	Purchased	22	0.7	860	25.6	882	26.2
	Other (borrow, gift, heritage)	5	0.1	53	1.6	58	1.7
UTILIZATION	Milk Production (Kg)	–	–	3,045	90.5	3,045	90.5
	Sale	276	8.2	2	0.1	278	8.3
	Others (reproduction, fattening, working)	34	1.0	8	0.2	42	1.2

3.5.2 Parameters of reproduction

The fertility rate is defined as calvings (including abortion) to the number of cows on production and the conception rate is the number of calves born alive to the number of cows on production. The overall results was shown in table 5.

Table 5. *Parameters of reproduction.*

Age (years)	Fertility rate (%)	Conception rate (%)	Prolificity rate (%)	Abortion rate (%)
2 - 3	27.6	27.0	100.0	0.6
> 3 - 4	66.5	64.7	100.0	1.9
> 4 - 5	77.2	75.2	100.0	2.0
> 5 - 6	77.4	75.6	100.3	2.1
> 6 - 7	75.2	74.0	100.0	1.2
> 7 - 8	81.8	79.9	100.0	1.9
> 8 - 9	79.2	75.2	100.0	4.0
> 9 - 10	78.6	78.6	100.0	0.0
> 10 - 14	82.1	80.8	101.6	2.6

The fertility rate of all the females was around 75%. It was relatively low which indicated the problem of infertility.

Calving intervals used as one of parameters for measuring the conception confirmed that there was such problem.

Analysis of the data collected at the Centre for Research in AI, results were as follows: average calving interval (days) between 1st and 2nd, 2nd and 3rd, and 3rd and 4th were 486 (n=629), 461 (n=424) and 452 (n=254) respectively.

Abortion rate was relatively homogeneous and generally low : 1.5 to 2.5% excepted for the age of 8 to 9 years which accounted to be 4%.

3.5.3 Parameters of production

The overall results were shown in table 6. Mortality rate is defined by the relation of the number of animals of each age group considered, died in the year divided by average number of animals on production of that group. On average, it was 4.6% between 0 to 1 year (4.4% for the males and 4.8% for the females) and rather low for the whole lot of other groups.

The exploitation rate is defined by the relation of animals sold or slaughtered of one age group considered divided by average number of animals on production of that group.

Our findings as shown in table 6 that the exploitation of the males was very much higher than those of the females especially between the age of 3to 18 months, during this period almost all the males were sold.

Sale of females was carried out afterward, between the age of 1 to 3 years, and with low percentage of animals (8-10%), because the majority of them served as the investment.

3.6 Results of haematological and serological examination :

While conducting the survey the operator collected 2 blood samples for each animal, one for haematological and the other for serological examinations.

Haematological examination consisted of :

3.6.1 Measuring the level of haemoglobin using spectrophotometer.

3.6.2 Following centrifugation, calculation of haematocrit concentration and examined the buffy coat for trypanosomiasis and microfilariasis.

3.6.3 Blood smears and Giemsa staining for blood parasites investigation.

The results were as follows: average value of haemoglobin was 10.75 (±1.8) gm/100 ml (n=1868) and of the haematocrit 31.1 (±4.9) (n=1872).

Examination of the blood smears revealed *Anaplasma marginale* 5.7% and of the buffy coat, microfilaria 5.8% of the blood samples.

Serological examination has shown that there was low incidence of brucellosis (0.08%). While for analysis of leucosis and IBR, they were 0% and 54.2% of aborted cows (n = 24) respectively.

4. Type of farming

Table 7 presented the variables encountered for the factorial analysis of the correspondances and their modalities. This analysis allowed us to show that there were 4 groups of dairy farm, table 8 showed general characteristics of each individual group.

Group 1 (32% of the farms)

This group possessed the general characteristics (age of the farmers, different surface area and herd) which were similar to the average of the farms enquired. It was different from other groups by the fact that majority of them were interested in applied modern technique for rearing their animals, feed and feeding, distribution of concentrate and minerals, heat detection several times a day. It was also found in this group of farmers less cases of repeat breeder cows.

Table 6 *Parameters of production.*

Age group	Males					Females					Combined				
	No.	Death	%	Exp.	%	No.	Death	%	Exp.	%	No.	Death	%	Exp.	%
0 - 3 mo	1,327	48	3.6	161	12.1	1,240	37	3.0	4	0.3	2,567	85	3.3	165	6.4
〉 3 - 6 mo	1,118	6	0.5	346	30.9	1,199	11	0.9	13	1.1	2,317	17	0.7	359	15.5
〉 6 - 12 mo	766	5	0.7	506	66.1	1,175	12	1.0	69	5.9	1,941	17	0.9	575	29.6
〉 12 - 18 mo	119	0	0.0	98	82.4	801	3	0.4	81	10.1	920	3	0.3	179	19.5
〉 18 mo - 2 yr	21	0	0.0	1	4.8	717	0	0.0	27	3.8	738	0	0.0	28	3.8
〉 2 - 3 yr	4	0	0.0	2	50.0	445	1	0.2	44	9.9	449	1	0.2	46	10.2
〉 3 - 4 yr	1	0	0.0	1	100.0	254	3	1.2	20	7.9	255	3	1.2	21	8.2
〉 4 - 5 yr	0	0	0.0	0	0.0	136	1	0.7	4	2.9	136	1	0.7	4	2.9
〉 5	0	0	0.0	0	0.0	83	1	1.2	5	6.0	83	1	1.2	5	6.0

Exp. = Exploitation

Table 7. *Distribution of the effectives according to different modalities.*

Variables	Modality	Number	%
Distance from the Centre	≤ 2 km	124	43
	> 2 km and ≤ 5 km	105	36
	> 5 km	61	21
District	1	185	64
	2	57	19.5
	3	23	8
	4	25	8.5
Age of farmer	≤ 36 yr	83	29
	> 36 and ≤ 50 yr	107	37
	> 50 yr	100	34
Size of family	≤ 4	97	33
	> 4 and ≤ 6	112	39
	> 6	81	28
No. of working persons	≤ 2	150	52
	> 2 and ≤ 4	92	32
	> 4	48	16
Cultivator	yes	206	71
	no	84	29
Aquaculture	yes	4	1
	no	286	99
Commerce	yes	14	5
	no	276	95
Total surface	≤ 5 rai	91	31
	> 5 and ≤ 12 rai	95	33
	> 12	104	36
Surface of paddy field	0	116	40
	1 and ≤ 10 rai	114	39
	> 10 rai	60	21
Surface of forage crop	0	64	22
	1 and ≤ 3 rai	181	62
	> 3 rai	45	16
No. of bovine	≤ 10	158	55
	> 10 and ≤ 20	108	37
	> 20	24	8
No. of porcine	0	160	55
	≤ 5	106	37
	> 5	24	8
No. of poultry	0	82	28
	≤ 10	96	33
	> 10 and ≤ 30	95	33
	> 30 and ≤ 150	14	5
	> 150	3	1
Cattle-shed	Traditional	40	14

Table 7. (contin.)

Variables	Modality	Number	%
	Improved	250	86
Distribution of paragrass	yes	238	82
	no	52	18
Distribution of stem and leaves of the maize	yes	205	71
	no	85	29
Distribution of the shuck of the maize	yes	104	36
	no	186	64
Distribution of concentrate during dry period	yes	157	54
	no	133	46
Distribution of minerals	continuation	52	18
	discontinuation	148	51
	No distribution	90	31
Heat detection	Morning	120	41
	Several times during the day	168	58
	No precision	2	1
Possessed repeat breeder cows	yes	153	53
	no	134	46
	No precision	3	1
No. of milking cows	0	5	1.5
	< 2	61	21
	> 2 and < 5	144	50
	> 5	80	27.5
Milk production/cow/day (kg)	0	5	2
	< 7	96	33
	> 7 and < 9	91	31
	> 9 L	98	34

Table 8. *Principal characteristics of different groups of farming (%).*

Variables	Mean	Group			
		1	2	3	4
Distance from C. A. I.					
≤ 2 km	43	36.6	19.5	77.5	19.0
> 2 km and ≤ 5 km	36	26.9	64.4	15.7	47.6
> 5 km	21	36.6	16.1	6.7	33.3
Age of farmers (years)					
≤ 36 yr	29	23.7	28.7	37.1	14.3
> 36 and ≤ 50 yr	37	39.8	36.8	30.3	52.4
> 50 yr	34	36.6	34.5	32.6	33.3
No. of active persons					
≤ 2	52	35.5	75.9	52.8	19.0
> 2 and ≤ 4	32	57.0	19.5	14.6	42.9
> 4	16	7.5	4.6	32.6	38.1
Cultivators					
yes	71	73.1	88.5	48.3	85.7
no	29	26.9	11.5	51.7	14.3
Total surface					
≤ 5 rai	31	26.9	21.8	52.8	0.0
> 5 rai and ≤ 12 rai	33	41.9	33.3	25.8	19.0
> 12 rai	36	31.2	44.8	21.3	81.0
Surface of paddy field					
0	40	34.4	29.9	56.2	38.1
1 and ≤ 10 rai	39	46.2	41.4	29.2	42.9
> 10 rai	21	19.4	28.7	14.6	19.0
Surface of forage crop					
0	22	21.5	10.3	39.3	0.0
1 and ≤ 3 rai	62	63.4	86.2	47.2	23.8
> 3 rai	16	15.1	3.4	13.5	76.2
No. of bovines					
≤ 10	55	45.2	67.8	62.9	4.8
> 10 and ≤ 20	37	50.5	31.0	33.7	19.0
> 20	8	4.3	1.1	3.4	76.2
Stable					
Traditional	14	14.0	23.0	7.9	0.0
Improved	86	86.0	77.0	92.1	100.0
Distribution of paragrass					
yes	82	89.2	86.2	67.4	95.2
no	18	10.8	13.8	32.6	4.8
Distribution of stem and leaves of corn					
yes	71	81.7	37.9	93.3	61.9
no	29	18.3	62.1	6.7	38.1

Table 8. (contin.)

Variable	Mean	Group			
		1	2	3	4
Distribution of corn shucks					
yes	36	65.6	12.6	21.3	61.9
no	64	34.4	87.4	78.7	38.1
Distribution of concentrate during - dry period					
yes	54	75.3	35.6	46.1	71.4
no	46	24.7	64.4	53.9	28.6
Distribution of minerals					
- continue	18	16.1	10.3	27.0	19.0
- discontinue	51	66.7	33.3	46.1	76.2
- no distribution	31	17.2	56.3	27.0	4.8
Heat detection					
- Morning	41	30.1	55.2	39.3	42.9
- Several times per day	58	69.9	43.7	59.6	57.1
- No precision	1	0.0	1.1	1.1	0.0
Presence of repeat breeder cows					
yes	53	37.6	54.0	64.0	66.7
no	46	60.2	46.0	34.8	33.3
no precision	1	2.2	0.0	0.0	0.0
No. of milking cows					
0	1.5	1.1	4.6	0.0	0.0
≤ 2	21	16.1	32.2	18.0	9.5
> 2 and ≤ 5	50	50.5	48.3	57.3	19.0
> 5	27.5	32.5	14.9	24.7	71.4
Milk production/cow/day					
0	2	1.1	4.6	0.0	0.0
≤ 7 kg	33	25.8	39.1	39.3	14.3
> 7 kg and ≤ 9 kg	31	34.4	26.4	32.6	33.3
> 9 kg	34	38.7	29.9	28.1	52.3

- *Group 2* (30% of the farms)

In this group the majority of the farmers were paddy cultivator who possessed small number of dairy cows (67.8% of the farms possessed less than 10 cows). They utilized small number of personnels, more than 2 actives for 75.9% of the farms and operated according to the traditional method. High percentage of farmers did not distribute minerals and concentrate during the dry period and detection of estrus was conducted only once a day.

- *Group 3* (31% of the farms)

This group represented small holders operated around the Centre for Research in AI (77.5% situated less than 2 km). They were mainly farmers who did not possess the forage area and have to purchase

leaves and stem of the maize for feeding their animals. All modern technique of farming was not applied. The incidence of repeat breeder cows was highest than other groups and milk yield was lowest.

- *Group 4* (7% of the farms)

This group was large farm represented a minority. They possessed a big forage area, herds and number of working population. Agriculture was generally associated with cattle farming. The farmers were modern, no traditional cow-shed were encountered. The distribution of concentrate and minerals was practiced more than average. Their milk production was also superior to other groups.

Conclusion

The findings of this survey rendered us to precise general characteristics of dairy farms in these 2 provinces. Furthermore, infertility problem was revealed in a high percentage of farms together with prolonged calving intervals and high incidence of repeat breeder cows.

Certain factors which may play important role in the infertility problem have been identified : husbandry factors (irregular distribution of mineral supplement and concentrate, poor heat detection) and pathologic (incidence of anaplasmosis, trypanosomiasis). All the factors which can have a negative effect on fertility have not been identified and their real importance have to be determined. For such action, an epidemiological approach for the investigation on the problem of infertility allow us to precise the effects of pathology of parturition and of the post partum, the principal factors having an impact on the reproduction and their interaction. It's necessary to carry out on the second phase of the project.

Summary

Institut d' Elevage et de Medecine Veterinaire des Pays Tropicaux (I.E.M.V.T.) France, Department of Obstetrics, Gynaecology and Reproduction (OGR), Faculty of Veterinary Science (FVS), Chulalongkorn University and Department of Livestock Development (DLD) organized a survey on infertility problem in dairy cattle at Ratchaburi and Nakhonpathom.

The project is divided into 2 phases.

- *Phase 1* : Questionnaires and blood samples for analysis
- *Phase 2* : Follow-up randomized selected herds.

The first phase was carried out during October 1986 to January 1987. Two hundred and ninety four farms (2,287 heads of cows) were investigated.

This survey revealed several interesting data about :

- The situation of the farmers : On average the age of the farmers was 45 years (range 21 to 81 years), there were 6 persons per family, working males and females were 1.6 each. Seventy point seven per cent of the farmers combined activities of dairy farming with cultivation.
- The farms : The average distance from the AI Centre was around 4.2 km. The average total surface area was 11.25 rai, paddy field is the most important and accounted to be 60% of the farms who raised dairy cattle, the surface area for forage cultivation was 2 rai.
- The Livestock : Average for each farm was 12 cows, the majority (84%) built cow shed separated from the house.
- The rearing system : Paragrass up to 82% was given to the animals. All farmers gave concentrate and generally (96%) it was bought, only 18% of the farms distributed mineral supplement all year round. Heat detection was conducted several times a day for 53%. Ninety point four per cent used AI service. On average milk production was found 8 kg per cow per day (range 2.7 to 16.7 kg). Four different types of dairy production systems were also identified.
- The parameters of the herd : Mostly Holstein Freisian crossbred (98%) other breeds were Australian Illawara Shorthorn, Brown Swiss and Red Dane. Seventy six per cent of the male were sold between the age from birth to 1 year of age compared to 7% for the female. Thus the herd was composed

mainly of female (90.8%) they tended to be culled after the age of 8 years onwards. Fertility rate was around 75% together with prolonged calving intervals 452 to 486 days indicated the infertility problem.

Certain factors which may have a negative effect on fecundity were also indentified such as the irregular distribution of mineral supplements and concentrate, 32% of the farmers did not distribute any complement minerals during dry period, 36% of the farmers did not give the concentrate to their animals, poor heat detection (41.2% of the farmers observed estrus only once a day) and pathological conditions (examination of smears and "buffy coat" revealed blood parasites). *Anaplasma marginale* and microfilariasis 5.7% and 5.8% of blood samples respectively. *Trypanosoma evansi* was found only from one big farm with high percentage (51.5%) of the whole milking cows (n = 212). Serological examination revealed antibody of IBR 54.2% of aborted cows (n = 24).

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