CHAPTER 6

LIVESTOCK

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6.1 Present Situation of Livestock Industry in Thailand

Thailand in recent years attained a remarkable rise in per capita income as supported by rapid economic growth, and this rise accordingly affected a continuously increasing tendency in the consumption of livestock products. After the currency/economic crisis happened in1997, however, the tendency has changed to a decreasing trend due to the depressed production by small/ medium scale livestock farmers as caused by slump of consumer purchasing power, escalated price in imported products and the failures of financing institutions, etc. Furthermore, there are many negative factors causing higher and fluctuating livestock product prices in Thailand such as lower productivity as caused by the El Nino phenomenon and extreme escalation of feed prices and so on, all of which describe the overall circumstances of the livestock industry in Thailand in its most difficult situation ever.

6.1.1 The Eighth National Economic and Social Development Plan

Thailand has been experiencing an acute economic crisis since July 1997. In order to minimize the economic impact on the society and to steer the economy recovery of the country, the Government decided to review and revise the 8th plan, aiming at a sound economic structure for future development under such circumstances. The concept, objectives and strategies of the revision of the 8th plan are based on the old 8th plan. The principal guidelines for the revision of the 8th plan can be identified as follows:

- To adjust the macro-economic framework and to maintain economic stability;
- To formulate the guideline for human and social development leading to minimize the economic impact on the population;
- To accelerate restructuring of the economic structure in order to lay a sound and stable economic foundation; and
- To formulate a restructured administration and management system for national development.

Based on the above assessment, the 8th plan focuses on the following two (2) targets in the field of livestock industry promotion:

- To expand production of livestock products to lead to improvement of self–sufficiency ratio as well as export promotion; and
- To provide the domestic market higher quality and sanitary products at a reasonable price level.

In line with the target set, number of heads, production quantity as well as the volume of consumption have been figured out as the livestock promotion plan as shown Table 6.1

Under the plan, remarkably large growth is expected in milk cow and chicken (broiler) production. For milk cow, the number of heads is planned to be almost triple (270%) with the annual growth rate of about 22% during the 5-year period from 1995 to 2001. Accordingly, the milk consumption per capita is planned to be double (200%) during the same 5-year period. This is in line with the policy to improve nutrition and enhance import substitution concerning milk and dairy products. As for chicken, target is set to expand the broiler production for which about 20% of the production is exported at present.

Table 6.1 Livestock Promotion Plan under 8th NESDP

Items	1995 Standard years	2001 Target years	Growth Rate per annum (unit:%)
1. Milk Cow			
Number of heads	248,319	783,000	22.5
Production of raw milk 1/	385,400	1,443,900	30.2
Per capita milk consumption 2/	12.0	24.0	
2. Beef cattle			
Number of heads	7,321,821	8,083,882	2.0
Production of raw milk 1/	203,188	237,018	3.1
Per capita beef consumption 2/	3.0	4.0	
3. Swine			
Number of heads	8,561,921	11,278,000	5.7
Production of raw milk 1/	346,500	390,740	2.4
Per capita pork consumption 2/	6.0	7.0	
4. Poultry			
Number of birds 3/	67,200	275,335	32.6
Production of raw milk 1/	346,500	390,740	2.4
Per capita chicken meat consumption 2/	13.9	18.7	

1/ unit:t 2/ unit: kg/man/year 3/ unit: million

Source: 8th NESDP

6.1.2 Present Situation of Livestock Industry

(1) Changes in Number of Heads Raise

Livestock raising in Thailand mainly consists of the following five (5) kinds: water buffalo, cow, swine, poultry, and duck. The regional distribution of livestock raising can be shown in Table 6.2.

- Decrease in buffalo heads is remarkable, which can be attributed to the shift to mechanized farming from buffalo use.
- Cattle raising is increased by about 5% in the North-east and South Regions but decreased in the North and Central Regions. This can be attributed to the increased initial investment cost for seed animals and feeds as caused by the economic crisis, which resulted in higher production cost as compared to the selling price, and negatively affected the farmers' production motivation.
- Both swine and chicken showed a high growth rate in the Central Region. Individual farm management at small and medium scale operation is mainly for the local consumption purpose. While commercial management at a larger scale is located at the suburb of the urban area. This indicates the expanding trend of consumption in urban and suburban areas. The high growth rate for chicken production is derived from the remarkable growth in broiler production for export but not for home consumption.

Table 6.2 Changes in Livestock Raising

(Unit: ten thousand head, birds)

Item	Buffalo			Cattle/Cow			Swine			Duck			Poultry		
Year / Region	1988	1997	Growth Rate per annum (unit:%)	1988	1997	Growth Rate per annum (unit:%)	1988	1997	Growth Rate per annum (unit:%)	1988	1997	Growth Rate per annum (unit:%)	1988	1997	Growth Rate per annum (unit:%)
North-east	3564.8	1911.6	-0.07	1568.4	2372.3	0.05	1221	1890.1	0.05	5873	6027	0.00	20356	42104.8	0.08
North	650.7	187.1	-0.13	1128.6	1068.4	-0.01	1130	1455.9	0.03	1261	2176	0.06	11832	24458	0.08
Central	300.3	135.6	-0.08	1306	1266.6	0.00	3033	5763.2	0.07	7590	11470	0.05	52469	79928.5	0.05
South	103.9	59.6	-0.06	592.5	887.5	0.05	355.9	1029.8	0.13	1290.7	2155	0.06	5152.8	18149	0.15
Total	4619.7	2293.9	-0.07	4595.5	5594.8	0.02	5739.9	10139	0.07	16014.7	21828	0.17	89809.8	164640	0.37

Source: Agricultural Statistics of Thailand Crop year 1988/1997

(2) Regional Distribution of Livestock

1) Regional Distribution

Table 6.3 shows the distribution of livestock, by kind and by region, in the crop year1996/ 1997.

Table 6.3 Distribution of Livestock Raising, by Kind and by Region

Item / Region	Buffalo	Cattle	Swain	Ducks	Poultry
North-east	77.1%	39.5%	24.1%	27.1%	23.2%
North	13.9%	26.2%	23.2%	7.6%	20.1%
Central	6.6%	22.0%	39.4%	55.9%	47.7%
South	2.4%	12.3%	13.4%	9.4%	9.0%
Total	100%	100%	100%	100%	100%

Source：Agricultural Statistics of Thailand, Crop Year 1996/1997

- Water Buffalo is raised predominantly in the North-east Region, with 77% share in the year 1998.
- Cattle are raised mainly by the North-east Region and the North Region, accounting for 40% and 26% share respectively. The Thai government has given emphasis on the promotion of dairy farming under the national development plan and expects considerable growth in all the regions.
- Swine, poultry and duck are mainly raised by the Central Region with a share in the range of about 40% - 55%. This is mainly the case of intensive large-scale farming for large-scale market. In the North-east and North Regions, too, the shares are more than 20%. As for poultry production, broiler is produced by large-scale farming and mainly exported to Japan and European countries as frozen chicken.

2) Provincial Distribution

Cattle

In 1997, the number of cattle raised was 4,463,000 head with the following breakdown:

- Beef Cattle 4,568,000 Heads (94%); and
- Milk Cow 295,000 Heads (6%).

But of the total number of milk cows at 295,000, eleven (11) provinces had a combine share as much as 82% of total heads of milk cows and 83% of the national total milk production.

Table 6.4 shows production of provinces in milk cow raising, which reached almost 5 million heads in 1997.

Table 6.4 Production of Provinces in Milk Cow Raising in 1997

(Unit: Head, Raw milk kg/day)

Province	Number of heads	Number of dairy farmers	Number of head per farm	Dairy raw milk production
Ratchaburi	54,411	2,890	18.8	188,424.00
Nakhon Ratchasima	45,129	1,807	25.0	226,494.00
Saraburi	38,957	1,744	22.3	236,286.00
Lopburi	27,291	1,612	16.9	130,687.50
Prachuap Khiri Khan	19,433	1,114	17.4	93,181.00
Sa Kaeo	15,506	762	20.3	41,622.50
Nakhon Pathom	12,062	861	14.0	46,645.00
Chiang Mai	10,451	954	11.0	57,415.00
Nong Khai	7,694	484	15.9	14,890.00
Khon Kaen	5,943	441	13.5	22,276.00
Phetchaburi	5,193	441	11.8	26,509.00
Total	242,070	13,110	18.5	1,084,430.00
Whole Nation	295,423	16,762	17.6	1,304,525.05

Source : Agricultural Statistics of Thailand Crop year 1996/1997

Swine

In the year 1985, there were only two (2) provinces that raised over 200,000 heads of swine, but in 1997, the number of provinces has been increased to as many as 7 provinces.

While in 1985, the number of provinces that raised more than 100,000 but less than 200,000 heads of swine was only 7, in 1997 this number increased to 12. In particular, the increase is rapid and remarkable in the suburb of Bangkok and in the North- east Region.

(3) Production and Marketing of Livestock Products

1) Pork Meat

Production

Type of swine farming can be classified into the following three (3) groups:

a) Small-scale individual farm

Not more than 20 heads are raised at farmers' backyards as a sideline business. Feeding is of the old style with remains of meat and vegetables rubbish.

b) Medium-scale individual Farm

This type of farm is common in Thailand where piglets and feed are purchased from outside.

C) Large-scale Intensive farm

On average, about 3,000-4,000 heads of swine are raised and as many as 800-1,000 heads are brought to markets monthly. In this type of farm, production of feed is done by own resource and facility, and some farms even have their own slaughterhouse and processing facilities.

Major production areas of swine include Ratchaburi, Nakhon Ratchasima and Chachoengsao provinces where access is closer to Bangkok and Chiang Mai provinces in the North and Nakhon Phanom in the North–east Region. In parallel with the increasing consumption as caused by steady economic growth, the production of pork meat has been on increasing trend for some period. It was 915,000 tons in 1997, which is 7.3% higher than the previous year. The trend, however, has been declining since 1998 at 792,000 tons (13.5% lower than 1997) and furtherdecreased to 776,000 tons in 1999 (2% down from 1998). The decrease may be attributed to the negative effect on consumption by the 1997 economic crisis, as consumer purchasing power fellwhile prices soared.

Marketing Situation

Small-scale farms sell their products to merchants and through cooperatives to retailers, while medium-scale and large-scale farms deal with wholesalers in Bangkok on their –own marketing channel to supply to retailers and / or meat processing factories.

For trading or marketing of pork meat, the price is to be determined with reference to those indexes as publicly announced by the Swine Growers Association in Thailand as well as the CP group, the largest producers in the country. In order to improve the transparency in price setting, the CP group established the Nongjok live pork meat market, and those pork produced under the contract farming are sold to retailers in Bangkok and the neighboring suburbs. With this system, improvement is observed in that the price of pork meat is closely related with actual quantity marketed/ traded and also with the demand trend.

2) Chicken

Production

The poultry raising farmers producing broilers are mainly divided into 2 types. One type includes independent poultry raising farmhouses breeding mainly local-breed fowls in their facilities with their own investment, which are relatively small-scale farmhouses. The other type includes large-scale production farmhouses, so-called “integrators”, and

poultry raising farmhouses that produce broilers under contracts with integrators. The independent farmhouses have a market share of 20% to 30% and the integrators have about 70% to 80%. The production of chicken has been increasing in the last few years in the background of the growth of domestic consumption and favorable export, such as pork. The quantities of broilers raised in the study areas are shown in the table below. The decrease in 1998 in the quantity of fowls raised in 3 prefectures under the study was caused by the effect of the currency crisis in the second semi-annual term of 1997 that boosted up the prices of cattle fodder including imported fodder, resulting in decrease of number of large-scale producing farmhouses.

Table 6.5 Livestock Population

Unit : 103 Birds

	Chicken				
	1985	1995	1998	Average Annual Growth Rate	
				85-95	95-98
Nakhon Phanom	1,182.8	1,531.0	966.9	2.61%	-14.20%
Sakon Nakhon	1,071.0	2,283.9	1,416.4	8.78%	-14.72%
Mukdahan	394.5	792.4	677.6	8.06%	-5.08%
Kalasin	805.9	712.7	950.1	-1.36%	10.06%
	3,454.2	**5,320.0**	**4,011.0**	**4.92%**	**-8.98%**

Source: Livestock statistics (Ministry of Livestock.1999)

Distribution Conditions

The independent poultry raising farmhouses market their products through cattle dealers to distributors and retailers while integrators ship the products mainly to the markets and chicken processing plants in Bangkok. Mainly integrators handle exports.

3) Eggs

Production

The production of eggs in Thailand is a nearly complete industry operated in the processes of importing commercial chicks from other countries including the U.S.A., raising of hens and producing eggs. Thus, this industry was directly affected by the boosted prices of imported chicks due to the currency crisis. As a result, the production of eggs has been decreasing after 1998.

Distribution Conditions

The egg production farmhouses are mainly divided into 2 types. One type includes independent farmhouses that gather into the production zone around the Metropolitan

City of Bangkok. The other type includes farmhouses that are producing under contract with integrators. The independent farmhouses have the market share of 80% while the integrators have about 20%. These market shares are inverted to those of chicken. The major reasons for this phenomenon are that the import of egg-breeding hens is exclusively handled by private enterprises, resulting in high prices, constant shortage of egg-breeding hens and high land costs for facilities. Thus, new penetrations into this industry and scale expansion have become difficult. The distribution routes are also occupied at a high rate by independent poultry raising farmhouses and small-scale distributors. Consequently, this condition has lowered the farmers' ability of deciding the selling prices of eggs.

6.2 Future Demand for Livestock Products in Thailand

6.2.1 Change and Prediction of Food Consumption

The higher income level obtained by the economic growth in Thailand has changed the eating habits of the Thai people, so that the ingestion quantities of starchy foods has decreased while the ingestion quantities of oils and fats in sea foods and livestock products have increased. The calorie intake per capita/day as the index for quantitative increase of food consumption in Thailand increased rapidly, from 2,153 kcal in 1989 to 2,300 kcal in 1994 and 2,400 kcal in 1998.

On the other hand, the calorie change brought by the enhanced income level in Japan showed the increase from 2,291 kcal in 1960 to 2,400 kcal in 1964 and 2,500 kcal in 1968 until it reached 2,600 kcal per capita/day in 1986. In recent years, it has remained on the same level of 2,800 kcal. (Refer to "Food Self-supply Table" issued by Agriculture, Forestry and Fisheries Ministry.)

The prediction of the calorie change until 2020 in Thailand shows that it will remain in nearly the same level in future as in Japan though the growth rate for the past 10 years was approximately 1.3%. Assuming that the calorie value per capita/day in Thailand will reach the same level as in Japan, the calorie change is predicted as shown in Table 6.6 below.

Table 6.6 Calorie Consumption Projection

	Thai				Japan
Year	1998	2000	2010	2020	1998
Kcal/day	2,462	2,517	2,739	2,897	2,874

Source: JICA Study Team

6.2.2 Features of Eating Habits

The calorie increase in Japan has been based on the increase in the consumption of livestock products and oils and fats per capita/year. The consumption of meats among livestock products increased six times, from 5.2kg in 1960 to 31.3kg in 1995. Milk and dairy products increased 4.1 times from 22.2kg in 1960 to 91.3kg in 1995, and eggs also 2.8 times from 6.3kg to 17.6kg. Oils and fats also increased from 4.3kg to 14.6kg, 3.4 times. On the other hand, rice consumption showed a decrease of over 40% from 114kg in 1960 to 67.8kg in 1995. (Refer to "the Food Self-supply Table" issued by Agriculture, Forestry and Fisheries Ministry.)

In Thailand, it is also foreseen that the eating habits will change similarly, but the qualitative aspect in terms of nutritive balance has been considered.

The consumption of agricultural and livestock products per capita/year in Thailand, Japan and Europe is shown in Table 6.7. The rates of protein (P), carbohydrate (C) and fat (F) contained in the total consumption in Table 6.7 are shown in Table 6.8.

In Table 6.7 and Table 6.8, the P.F.C in Japan has a good nutritive balance because those components are obtained from a variety of foods such as livestock products, fish and shellfish, as well as fruits and vegetables. On the other hand, the eating habits in Europe are based on excessive fat and high protein intake. According to the prediction of the future tendency toward balanced food consumption in Thailand, there is a need to use other foods to supplement the carbohydrate intake that will decrease as the rice consumption slowly falls. As the consumption of protein and fats is expected to increase to the same level as in Japan, it is also predicted that the calorie intake will be secured as expected. Based on the above assumption, the balanced food consumption per capita/year predicted after 20 years is shown in Table 6.9.

Table 6.7 Food Consumption per Capita per Year

Thailand (Unit:Kilograms per person per year)

YEAR	Rice	Cereals	Sugar-crops	Sweet-eners	Vege-tables	Oil crops	Fruits	Beef	Pork	Poultry	Milk	Eggs	Fish, Seafood	CALORIES (per day)
1989	112.4	21.9	29.4	18.0	36.9	28.0	95.1	5.8	6.1	6.1	10.6	8.8	20.3	2,176
1994	107.5	27.4	57.0	24.2	37.3	28.6	94.4	5.9	8.4	13.9	19.3	9.8	30.1	2,328
1995	108.3	26.4	72.0	27.1	38.2	29.2	93.6	5.7	8.3	13.8	24.0	9.6	32.0	2,398
1996	107.4	28.0	68.4	28.0	37.1	22.7	92.2	5.6	8.6	14.4	23.3	9.9	31.2	2,422
1997	106.9	25.3	66.5	28.9	35.6	25.9	92.4	5.0	9.2	14.1	26.8	10.2	33.4	2,432
1998	109.0	26.9	69.4	30.7	36.3	24.9	88.5	4.5	7.8	15.8	21.6	9.5	33.1	2,462

Japan

YEAR	Rice	Cereals	Sugar-crops	Sweet-eners	Vege-tables	Oil crops	Fruits	Beef	Pork	Poultry	Milk	Eggs	Fish, Seafood	CALORIES (per day)
1989	64.9	105.8	0	35.4	118.9	21.4	51.7	7.7	15.7	13.6	65.6	18.8	72.1	2,906
1994	61.0	106.8	0	32.6	113.5	21.7	51.7	10.7	15.1	13.8	68.0	19.8	71.4	2,903
1998	60.0	105.8	0	30.5	109.8	23.4	47.2	10.8	16.2	14.5	68.3	19.4	66.5	2,874

Europe

YEAR	Rice	Cereals	Sugar-crops	Sweet-eners	Vege-tables	Oil crops	Fruits	Beef	Pork	Poultry	Milk	Eggs	Fish, Seafood	CALORIES (per day)
1989	3.7	208.5	0	38.8	118.1	18.3	93.2	20.7	41.5	15.1	231.2	13.0	19.6	3,405
1994	3.4	222.7	0	36.7	103.0	15.7	76.8	19.8	32.9	14.7	199.9	12.3	17.2	3,187
1998	3.9	221.9	0	38.0	110.3	17.0	76.3	17.5	34.2	15.7	209.1	12.1	19.7	3,217

Note: Food Balance Sheet, FAO

Table 6.8 Estimate of P.F.C. per Country Food Consumption

	YEAR	Carbohydrate	Protein	Fat	Others	Total
Thailand	1989	33.6%	14.4%	7.0%	44.9%	100.0%
	1994	29.1%	18.8%	6.2%	45.9%	100.0%
	1995	27.6%	19.1%	6.0%	47.3%	100.0%
	1996	28.4%	19.5%	4.8%	47.3%	100.0%
	1997	27.5%	20.6%	5.4%	46.5%	100.0%
	1998	28.4%	19.3%	5.2%	47.1%	100.0%
Japan	1989	41.0%	32.7%	8.7%	70.3%	100.0%
	1994	40.1%	33.9%	8.8%	71.4%	100.0%
	1998	40.6%	34.2%	8.2%	71.4%	100.0%
Europe	1989	25.8%	41.5%	11.3%	78.7%	100.0%
	1994	29.9%	39.3%	10.2%	79.4%	100.0%
	1998	29.1%	39.7%	9.8%	78.7%	100.0%

Note: Food Balance Sheet, FAO

Table 6.9 Food Balance Projection

Food	Thailand									Japan	
	Year	1998		2000		2010		2020		1999	
	Energy per Kg (Kcal/Kg) 1/	Annual Consump. (Kg), 2/	('000Kcal/ year)	Annual Demand (Kg), 3/	('000Kcal/ year)	Annual Demand (Kg), 3/	('000Kcal/ year)	Annual Demand (Kg), 3/	('000Kcal/ year)	Annual Consump. (Kg), 2/	('000Kcal/ year)
1. Rice	3,300	109.0	359.7	108.4	357.7	105.4	347.8	103.5	341.6	61.0	201.3
2. Other Cereals and Root Crops	955	27.0	25.8	27.9	26.6	38.0	36.3	42.0	40.1	107.0	102.2
3. Sugar crops	290	69.4	20.1	72.0	20.9	75.0	21.8	75.0	21.8	0.0	0.0
4. Sweeteners	3,483	30.7	106.9	33.0	114.9	35.0	121.9	39.0	135.8	36.0	125.4
5. Vegetables	190	36.3	6.9	36.2	6.9	37.0	7.0	37.0	7.0	120.0	22.8
6. Oil crops and Vegetable Oils	6,900	24.9	171.8	24.4	168.4	24.0	165.6	24.0	165.6	26.0	179.4
7. Fruits	807	88.5	71.4	87.3	70.5	84.0	67.8	85.0	68.6	55.0	44.4
8. Beef	2,790	4.5	12.6	4.3	12.0	6.5	18.1	9.5	26.5	11.5	32.1
9. Pork	2,113	7.8	16.5	8.2	17.3	14.5	30.6	17.5	37.0	18.0	38.0
10. Poultry Meat	1,935	15.8	30.6	17.5	33.9	18.0	34.8	18.0	34.8	16.0	31.0
11. Milk	785	21.6	17.0	22.0	17.3	38.0	29.8	47.0	36.9	70.0	55.0
12. Egg	1,490	9.5	14.2	9.6	14.3	12.0	17.9	13.0	19.4	20.0	29.8
13. Fish	1,110	33.1	36.7	36.0	40.0	45.0	50.0	52.0	57.7	71.0	78.8
14. Others			9.0		20.0		45.0		65.0		100.0
(Total per capita)			899.1		920.6		994.4		1,057.8		1,040.1
Average per capita (Kcal/day)			**2,463**		**2,522**		**2,725**		**2,898**		**2,850**

Note: 1/ USDA Nutrient Database, 2/ Food Balance Sheet, FAO, 3/ Estimated by JICA Study Team

6.3 Possibility and Issues of Livestock Farming Development in Northeastern Thailand

6.3.1 Possibility of Livestock Farming Development in Northeastern Thailand

The Northeast of Thailand is said to be the poorest region in the country, but it is an area having traditionally developed livestock farming technology. Of the gross product by region, the region having the highest rate of agriculture, forestry and fisheries is the Southern region. The Northeastern region is the lowest in the gross product per capita in Thailand, but the rate of agriculture, forestry and fisheries is rather high in the gross product. The livestock farming rate in the agriculture, forestry and fisheries field is 2.24%, the second highest following farming. Livestock farming is an important industry for the Northeastern region.

The agricultural cooperative bank has the largest performance as the public financing organization for farmers. The agricultural cooperative society can be financed if it meets given requirements. The agricultural cooperative bank is financing a total of 148 projects including 46 beef cattle projects, 88 milk cow projects, 14 poultry and hog raising projects, which are now in operation. Most of the beef cattle projects are planned in Northeastern Thailand and the milk cow projects are planned around Bangkok.

In Northeastern Thailand, buffaloes have been treated as a valuable property since old times and have been exchanged with cash in case of emergency in farming, such as drought. Livestock farming in backyards such as poultry raising has also been an important source of cash income and has also provided natural food sources in case of drought and food shortage. As mentioned above, the livestock farming in Northeastern Thailand is an industry that not only produces animal protein and creates opportunity of employment, but also provides the national land conservation function to make effective use of agricultural and industrial by-products such as refuse of soybeans and peanuts and residuals from pineapple canning plants and to use fallow fields and create grasslands. This type of industry is very important to this region with little natural resources and its importance will grow more and more in the future.

6.3.2 Issues

(1) Improvement of Milk Cows

In an interview survey of farmers, it has been found that there were differences in milk production by farmers between imported cows or Thai cows that were used at the start of livestock farming. These differences were caused by the fact that the domestic breeding of cows had little been developed. Thus, it is essential for livestock farming development that the breeding program to ensure quality milk cows to be available at home be promoted.

(2) Establishment of Superior Cow Promotion System

At present, most of successive cows at farmhouses were produced by farmers themselves, from which it could not be expected to produce high-quality cows. Therefore, it is necessary to establish a quality cow promotion system in which superior cows are easily made available to general farmers.

(3) Artificial Insemination – Production of Quality Sperms and Improvement of Artificial Insemination Technology

1) Production Quality Sperms

The sperms that are used for artificial insemination at present are not absolutely those of superior cows, but those of cows of unknown breeds. Thus, it is necessary to improve the quality of sperms to be produced by sire bulls selected from the cows with high productivity.

2) Improvement of Artificial Insemination

In the present conditions of artificial insemination, the engineers for artificial insemination who were trained by the Livestock Development Department and those who belong to the livestock farmers' cooperative societies are engaged individually in the work of artificial insemination for dairy producers. Thus, the responsibility system for artificial insemination technology is not clear. Further, there are many farmhouses that are involved in the problems of breeding performance in Northeastern Thailand. These problems are attributed to the lack of the knowledge and techniques that are required for dairy producers as well as to the low technical capability of artificial insemination engineers. In future, it is necessary to centralize the management of artificial insemination engineers and make efforts including training courses for technical improvement.

(4) Establishment of Cattle Disease Prevention, Diagnosis and Treatment System

If the cattle at a farmhouse suffer from a disease, an artificial insemination engineer in the neighborhood used to treat the cattle at his own discretion, so that an advanced level of diagnosis and treatment is impossible. Further, the number of clinical veterinarians who can make a tour of inspection is absolutely lacking. As the future issues, it is necessary to increase the number of clinical veterinarians, establish a system for providing treatments to farmhouses with ease and to build a system for regular visits for consultation on cattle sanitation.

(5) Promotional System for Improvement of Dairy Production Technology

At present, the production support system for general livestock raising farmers is incompletely provided and they have few channels to obtain the information to improve the livestock production technology. It is the actual conditions that a farmer hears such information from another farmer or he is running the operation based on the information available from an artificial insemination engineer. Thus, the improvement of breeding management technology is limited. The production improvement technology is being established by the experimental research agency of Livestock Development Department, so that it is necessary to establish the promotional system to disseminate the improvement technology to farmers and the production support system.

6.4 Policies for Livestock Farming Development

6.4.1 Policies for Livestock Farming Development

The objectives of the livestock farming policies of the Thai Government are “to expand the production of livestock products for improvement of the national self-supply rate and export promotion” and “to supply the nation with quality and safe livestock products at reasonable prices.” To achieve these objectives, it is required that the Government provide appropriate support and that farmers have the consciousness to supply quality products at fair prices to meet the requirements of the market based on the market economy.

Therefore, it is recommended, in the next 10 years (by 2010), that the highest priority target be aimed at higher production of livestock products and doubled revenue and that dairy production (milk cows) development and fodder improvement be realized through beef cattle raising for support of small farmhouses and the program of strengthening existing organizations.

(1) Small Farmhouse Support Program

Livestock farming is an industry requiring initial investment costs and taking a long time to acquire the revenue. At present, the livestock farmers tend to run their operation with short-term profit in mind. Therefore, it is recommended that the Government formulate a long-term operation plan for farmhouses and cooperative associations and support small-scale farmhouses for beef cattle raising. It is deemed that the promotion of beef cattle production is effective as one of the measures for increasing income and that the limited agricultural resources available in Northeastern Thailand can be effectively used. At present, smuggling of live cows from the surrounding countries is caused by the price differences between those countries and Thailand, but if cow raising is established at low costs, the effect of controlling the smuggling acts is also expected. The formulation of the long-term operation plan is also deemed to be effective not only for increase in income of livestock farmers but also for stable growth of the entire livestock farming industry.

(2) Fodder Improvement Program

Livestock farming is coming to a deadlock due to increased production costs including fodder costs. In beef cattle production, the number of heads of cows has been reduced because the prices of concentrated feeds have been higher than the selling prices of cows. One of the main farm products in Northeastern Thailand is cassava, and grass is also produced in fallow fields. Under these circumstances, the fodder improvement program will be implemented to suppress the production costs and supply livestock

products at reasonable prices. The fodder production is an important industry to ensure the effective use of unused resources.

6.4.2 Policies for Dairy Products Development

Governmental policy is expected to increase the fresh milk production, but it is necessary to improve the dairy production technology of farmers to cope with inappropriate fodder management and poor technical guidance. Further, the dairy production requires high costs, resulting in supply of domestic milk at a high price and suppressed milk consumption. Therefore, it is indispensable for development of dairy production to improve and promote the appropriate fodder management technology in close cooperation with experimental research agencies and to implement the breeding program to ensure high-quality milk cows to be made available within the country. If the dairy producer organization is strengthened and the distribution facilities are provided, it will be possible to suppress the production cost and produce high-quality and safe livestock products.