

No. 03

BASIC DESIGN STUDY REPORT
ON
THE ESTABLISHMENT PROJECT
OF
THE NATIONAL ANIMAL HEALTH AND PRODUCTION INSTITUTE
IN
THE KINGDOM OF THAILAND

FEBRUARY, 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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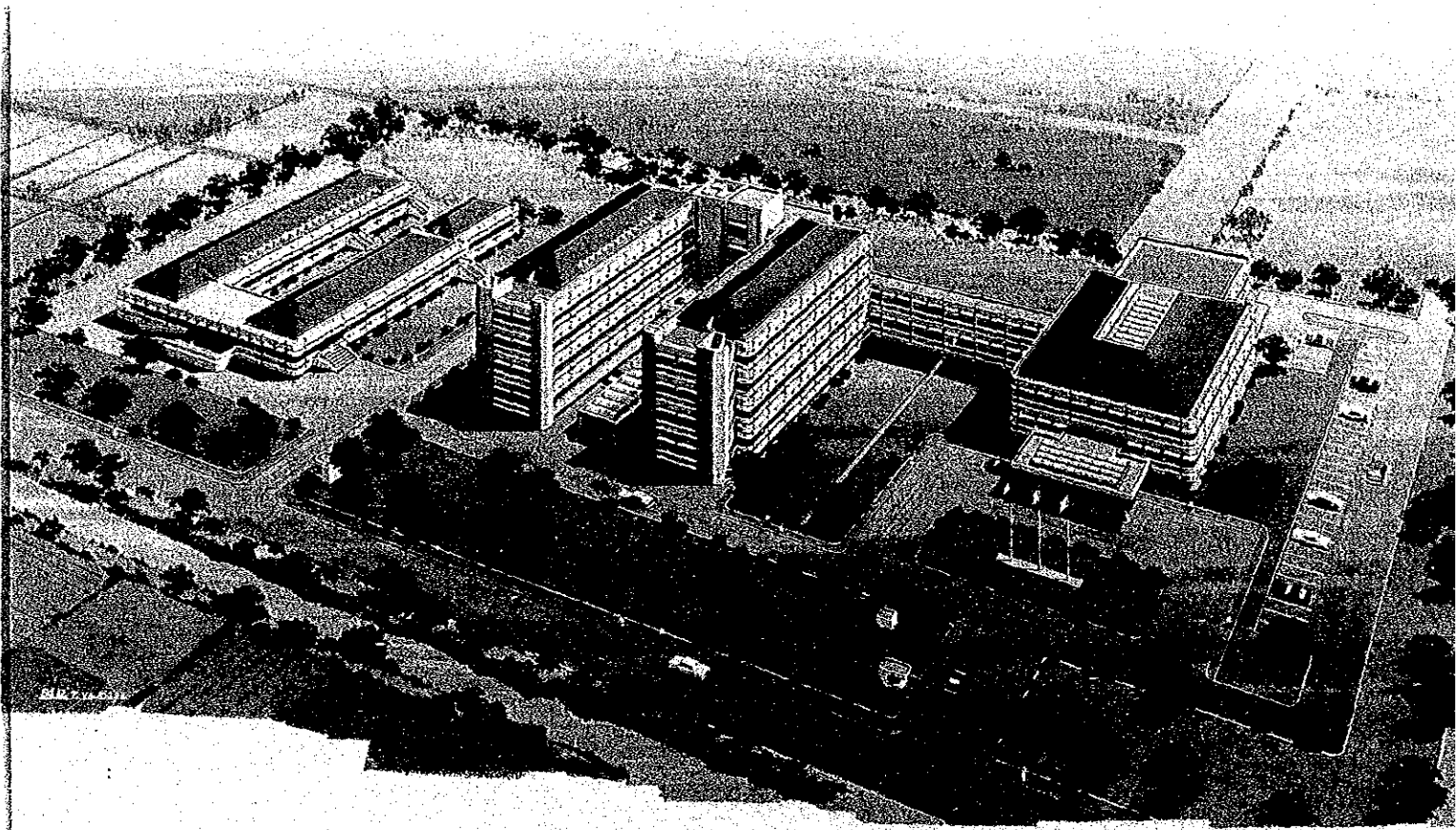
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THE NATIONAL ANIMAL HEALTH AND PRODUCTION INSTITUTE

PREFACE

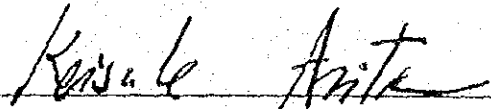
In response to the request of the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a basic design study on the Project for Establishment of a National Animal Health Institute and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Thailand a study team headed by Dr. Hiroyuki YUKI, Chief of Extension Section, Planning and Coordination Division, National Institute of Animal Health, Ministry of Agriculture, Forestry and Fisheries, from September 19 to October 9, 1984.

The team had discussions on the Project with the officials concerned of the Government of Thailand and conducted a field survey. After the team returned to Japan, further studies were made and the present Report has been prepared.

I hope that this Report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Kingdom of Thailand for their close cooperation extended to the team.

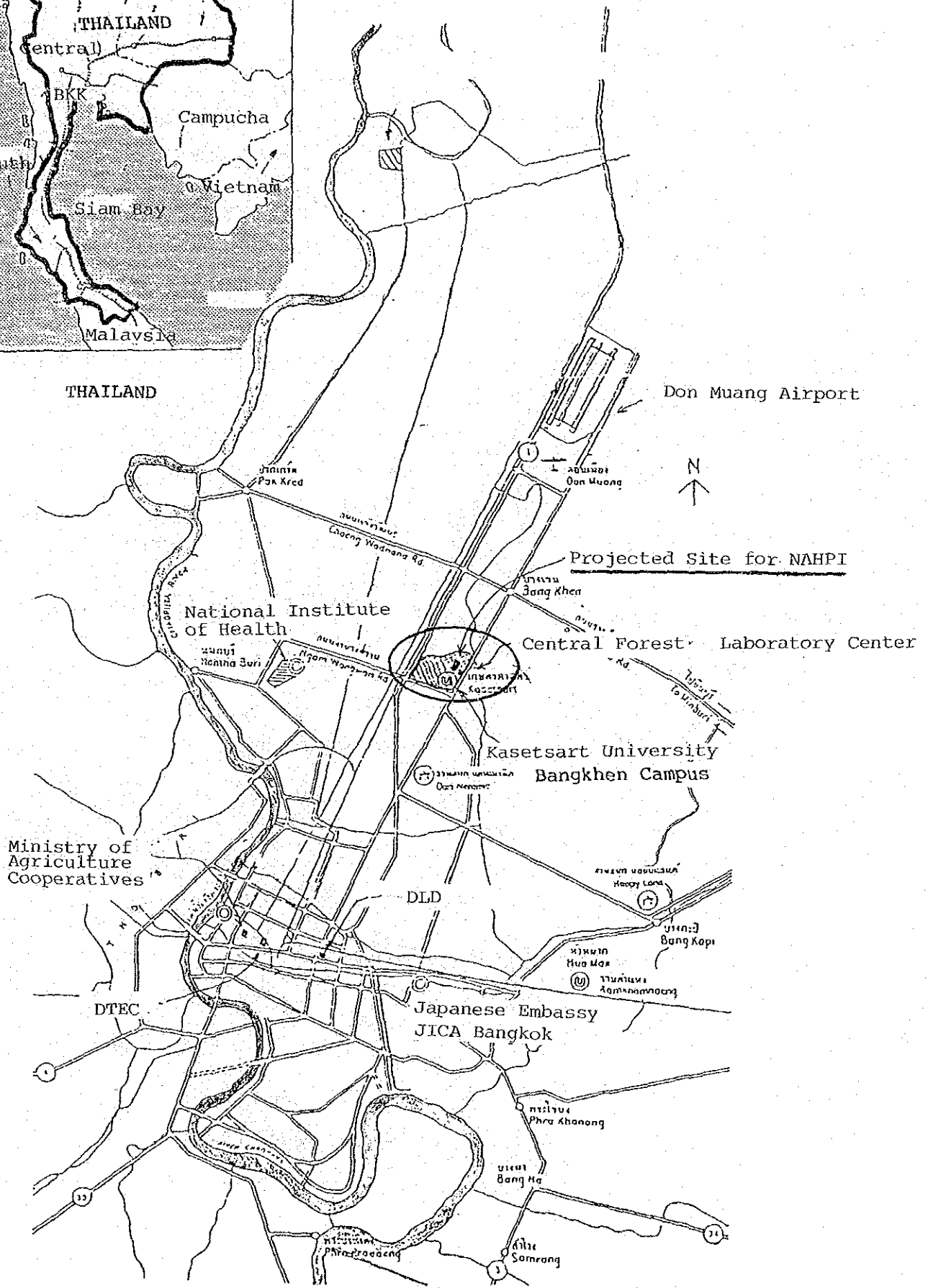
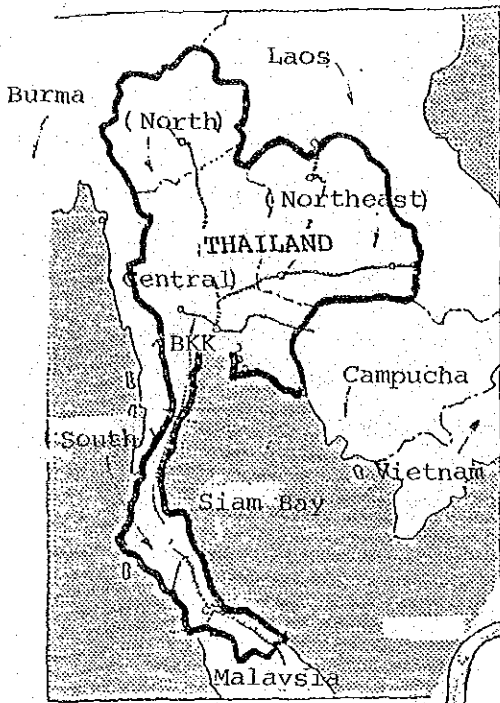
February, 1985



Keisuke ARITA

President

Japan International Cooperation Agency



BANGKOK

PROJECTED SITE AND RELATED GOVERNMENT OFFICES

CONTENTS

	<u>Page</u>
SUMMARY	1
CHAPTER 1: INTRODUCTION	
1-1 Proposal	6
1-2 Dispatch of Preliminary Study Team	7
1-3 Dispatch of Basic Design Team	10
CHAPTER 2: BACKBROUND OF THE PROJECT	
2-1 The Fifth National Economic and Social Development Plan (1982 - 1986)	13
2-2 Current Stage of Livestock Industry in Thailand	23
2-3 Existing Organization and Activities Concerning Animal Health in Thailand	41
CHAPTER 3: OUTLINE OF THE PROJECT	
3-1 Objectives of the Project	58
3-2 Activities of the Project	59
3-3 Organization and Personnel Plan	60
3-4 Necessary Facilities and Equipment	72
CHAPTER 4: BASIC DESIGN	
4-1 Conditions of the Project Site	75
4-1-1 Location and Current Conditions of the Project Site	75
4-1-2 Infrastructure around the Project Site	79
4-2 Policy for Basic Design	83
4-2-1 Basic Design Policies	83
4-2-2 Outline of the Project	85
4-2-3 Facility Size	87

4-3	Basic Design	89
4-3-1	Block Layout	89
4-3-2	Architectural Design	97
4-3-3	Structural Design	135
4-3-4	Utility Design	138
4-3-5	External Work	159
4-3-6	Equipment Plan	162
4-4	Basic Design Drawings	176
CHAPTER 5: OPERATION AND MAINTENANCE PLAN		
5-1	Operation Plan	213
5-2	Maintenance Plan	217
5-3	Estimates for Operation and Maintenance	224
CHAPTER 6: IMPLEMENTATION OF THE PROJECT		
6-1	Organization	231
6-2	Construction Program	234
6-3	Scope of Work	236
6-4	Tentative Overall Schedule	239
CHAPTER 7: PROJECT EVALUATION		
		241
CHAPTER 8: TECHNICAL COOPERATION		
		245
CHAPTER 9: CONCLUSION AND RECOMMENDATION		
		247
CHAPTER 10: APPENDICES		
(1)	Basic Design Study Team (Basic Design Study, Sept.-Oct., 1984)	249
(2)	Basic Design Study Team (Confirmation, Dec., 1984)	271
(3)	Others	279

SUMMARY

SUMMARY

In the Fifth National Economic and Social Development Plan, (1982 - 1986) the Government of the Kingdom Thailand is placing emphasis on policies intended to improve the structure and raise the productivity of the agricultural industry, the country's main industry. During the past twenty years, agricultural output has expanded at the rather high rate of about five percent per annum, in contrast to the world's average agricultural growth rate of less than three percent per annum. This has occurred in spite of the fact that, in Thailand, agriculture is rarely blessed with ideal weather, and prolonged droughts followed by floods are likely to place Thai agriculture in an extremely difficult situation.

As one of the measures aimed at improving and stabilizing the unstable agricultural structure in order to develop agricultural productivity, the Government has endeavored to expand the irrigation and road systems. Since 1961, the proportion of the total population living in absolute poverty has declined from 50% to about 25% at present. This is apparently a result of effective agricultural development.

However, this expansion of output has arisen mainly from the expansion of the cultivated area. It is evident that the land available as suitable land for agriculture is running out. At present, the situation of agriculture in Thailand is severe. The Government, in the Fifth Economic and Social Development Plan, has made great efforts to improve the unstable agricultural structure and agricultural productivity, promote agricultural development by methods including the encouragement of double cropping, diversification of cash crops and the livestock industry.

One of the greatest hindrances to livestock development is animal disease, and animal health services are a fundamentally important supporting element in this area.

In Thailand, animals suffer from various infectious diseases. The causes of these diseases are mostly related to the unfavorable climatic conditions, and there is inadequate improvement and development of technologies related to pathological research, diagnosis and vaccine production, inadequate training at various levels for veterinary staff, and an unsatisfactory information network in this country.

The Government of Thailand has established, as part of its animal health policy, the Veterinary Biologics Production Center and the Foot-and-Mouth Disease Vaccine Production Center, and the three regional Diagnostic Laboratory Centers are dealing with the improvement of regional activities related to animal health. These efforts are having a reasonable effect, thanks partially to the assistance of foreign countries. (Southern Regional Diagnostic Laboratory Center, Japan, 1977 - 1984; North-eastern Regional Diagnostic Laboratory Center, West Germany, 1978 - 1988; Foot-and-Mouth Vaccine Production Center, Japan, 1976 - 1977 and 1977 - 1985.)

The Department of Livestock Development, Ministry of Agriculture, the administrative organization in Thailand in charge of animal health, has recognized the need for establishing a new institute to assist in improving animal health in Thailand. The Department intends that this institute should be the central organization, provided with better and more sophisticated facilities and technology, and offering: improved control of local activities and efficient transfer of technical data gained from experience to local institutes; instruction, coordination, and diagnosis in relation to animal diseases throughout the country; training of animal health practitioners; and at the same time performance of animal health diagnostic and survey activities for the central area. It has thus requested, through the Government of Thailand, Grant Aid and Technical Cooperation from the Government of Japan.

In order to study the import of the request of the Government of Thailand, the Government of Japan decided to implement a Basic Design Study which was implemented by the Japan International Cooperation Agency (JICA). JICA dispatched, for the period from July 15 to 27, 1984, a Preliminary Study Team headed by Dr. Yujiro Fujisaki, to Thailand. The results of

this Preliminary Study led the Government of Japan to dispatch a Basic Design Study Team, headed by Dr. Hiroyuki Yuki and again organized by JICA, to Thailand from September 19 to October 9, 1984, to study further the adequacy of this Project and to draw up a suitable Basic Design. As a result of these studies, the Basic Design Team reached the conclusion that the promotion of intensive preparations by the central organization, namely the Department of Livestock Development (DLD), especially in the areas of research, training, and technical and technological improvement, is urgent, and in fact indispensable, if the DLD is to strengthen its ability to control, cooperate with and technically assist the local organizations.

For the effective performance of animal health research activities, the National Animal Health and Production Institute (NAHPI) will be set up on its own as a research sector for the DLD, and will be provided with sufficient facilities and equipment, so as to become a center of animal health activities in this country and to contribute to the development and spread of these activities. The work of the NAHPI will be in the main limited to animal health, but investigation of the technology of quality control of animal feed and animal products will also be possible. Respecting the intention of the Thai side to expand the facilities so as in future to cover animal production as well, the word "production" has been included in the name of the new institute.

It was agreed that the research division would be composed of five sections: Bacteriology, Virology, Parasitology, Pathology and Biochemistry. Other sections also included in accordance with the aims of this Project are: Planning & Coordination, Training and Extension, Information Center, etc. In addition, it was agreed for the purpose of effective and smooth research activities that the Laboratory Building, the Animal Experiment Building and the Training and Administration Building should be provided with facilities and equipment limited to the necessary minimum, and that integration of research activities and effective use of all common facilities and equipment should be strongly emphasized in the design and practical management of the NAHPI.

The outline of the Project is as follows:

Project Name: The Establishment Project of National Animal Health and Production Institute (NAHPI)

Objectives: Establishment of an institute to carry out research and related services in the field of animal health and animal production.

Research and related activities:

- a. Research related to animal disease surveys and diagnosis; to testing of the quality of feeds and animal products; and to the development and assay of biological products for veterinary use.
- b. Service activities connected with surveying and diagnosis of animal diseases.
- c. Collection, analysis and distribution of information in the role of a national center.
- d. Training of animal health personnel
- e. Technical cooperation with related organizations in the DLD.

Executing Agency: Department of Livestock Development Ministry of Agriculture and Cooperatives (DLD)

Project Site: Kasetsart University campus, Bangkok, Bangkok, Kingdom of Thailand

Site Area: Approximately 34,150m² (22rai)

Outline of Facilities:

1. Research Laboratories, four stories, reinforced concrete	5,085m ²
2. Animal Experiment Building, one story, concrete block	1,038m ²
3. Training and Administration Building, two stories, reinforced concrete	1,921m ²
4. Connecting Corridor, two stories, reinforced concrete	200m ²
<hr/>	
Total area	8,244m ²

Outline of Equipment:

The equipment necessary for the activities of the research laboratories, for common use, animal experiments, training, etc.

This Project, in accordance with the policies of the Thai Government, is intended to develop animal health in the Kingdom of Thailand by establishing a national central organization having the functions of research and assay, information analysis, training and education.

The Project also aims to bring about technical improvement of both basic and advanced research into animal health in this central organization, and is expected to further develop the research technologies in these fields in Thailand by upgrading technical standards in rural areas, and as a result, to lay a firm foundation for the improvement of animal health in Thailand, ultimately contributing to the development of the national animal health administration system. The establishment of the NAHPI will largely contribute to the development of the country's economy by stimulating the livestock industry and to furthering of the technical and economic level of the entire agricultural industry by more effective and extensive prevention of animal diseases. The technical cooperation for the Project is expected to proceed smoothly and effectively and will contribute to the promotion of mutual understanding and friendship between Japan and Thailand.

CHAPTER 1: INTRODUCTION

CHAPTER 1: INTRODUCTION

1-1 PROPOSAL

In the Fifth National Economic and Social Development Plan (1982-1986), agriculture is marked as the most important industry in Thailand. The Plan emphasizes policies intended to improve the agricultural system, raise agricultural productivity and develop all areas of the industry, including livestock, in each region.

For livestock development, one of the greatest hindrances is animal disease, which causes losses of animal resources and lowers the productivity, and animal health services are an essential and fundamental support.

In Thailand, various infectious animal diseases are reported. The causes of these diseases are related to the hot and wet climate of the tropics and to the inadequacy of improvement and development of research, diagnosis and vaccine technologies, of the training of various levels of veterinary staff, and of the organization of the information network.

On the basis of its animal health policy the Government of Thailand has established, with the assistance of foreign countries, the Veterinary Biologics Production Center and the Foot-and-Mouth Disease Vaccine Production Center, and three regional Diagnostic Laboratory Centers in the north (Lam Pang), northeast (Khon Kaen) and south (Thung Song), to improve animal health. Meanwhile, it has also endeavored to enrich and expand all aspects of veterinary services.

The Department of Livestock Development, Ministry of Agriculture, is the organization in Thailand with overall responsibility for animal disease control and diagnosis, and for the training of

animal health staff. It drew up a plan to establish a new institute as the central organization with better and more extensive facilities and technology for improved control of the local institutes, and for improvement of instruction, coordination, diagnosis of animal diseases all over the country, training of animal health practitioners and animal health survey activities for the central area. To implement this plan, the Government of Thailand has requested technical cooperation and Grant Aid from the Government of Japan.

1-2 DISPATCH OF PRELIMINARY STUDY TEAM

In response to the request of the Government of Thailand related to Grant Aid cooperation, the Government of Japan determined to carry out a basic design study. The Japan International Cooperation Agency (JICA) accordingly dispatched a Preliminary Study Team (the P/S Team) headed by Dr. Yujiro Fujisaki to Thailand from July 15 to July 27, 1984.

The details of the Project confirmed by the P/S Team based on the request by the Government of Thailand are as follows:

- (1) Name of the Project: The Establishment Project of The National Animal Health and Production Institute (NAHPI)
- (2) Requesting and Executing Agency: Department of Livestock Development, Ministry of Agriculture and Cooperatives (DLD).
- (3) Project Site: Three alternative sites are proposed. After studies of factors such as location, power supply, available land area, etc., the P/S Team judged the

Site 1 below to be the best suited for the Project. However, since it is too small for a national institute having the various facilities and equipment required, it will be necessary to request the transfer of ownership of an adjacent area of 2.3ha of fallow paddy fields currently belonging to the Department of Agriculture.

	Site 1	Site 2	Site 3
Location	Kasetsart Univ. compound, Bangkok City	Bang Ka-dee, Muang District, Pathum Tani Province	Khlung Luang, Pathum Tani Province
Distance from Bangkok	About 15km from the center of Bangkok	About 40km from the center of Bangkok	About 45km from the center of Bangkok
Land area	2.3 ha.	5 ha.	4.8 ha.
Present condition	<ul style="list-style-type: none"> Occupied by Pig Breeding Station and some ponds Located in the research and educational facility area 	Meadowland, near to DLD's AI center	Paddy and meadowland, near to Rice Seed Storage Laboratory Center

(4) Objective of the Project

The objective of the Project is to establish the NAHPI for the effective execution of research work for technical improvement and development and of service activities in the fields of animal health and animal production technology. The activities of the NAHPI will at first be limited to animal health and, in the field of animal production, only the techniques of assessing feed quality and animal products.

However, the word "production" was left in the name of the NAHPI out of respect for the desire of the Government of Thailand to expand its facilities to include activities related to animal production in the future.

NAHPI will serve as a national organization for the following activities:

- 1) Applied research for improvement, establishment or development of techniques for animal disease surveys, diagnosis, quality tests of feed and animal products, assay and diagnosis of biological products for veterinary use,
- 2) Service activities of disease surveys and diagnosis,
- 3) Collection, analysis and distribution of data and information on a national scale,
- 4) Training of people concerned with animal health and production,
- 5) Collaboration on technical matters with related organizations and Division of the DLD.

(5) Facilities and Equipment for the Project

- 1) Buildings with necessary facilities for NAHPI
- 2) Equipment for Research activities of NAHPI

(6) Organization

The NAHPI will consist of the following groups in order to play the important roles for which it established.

- 1) Director of the NAHPI
(The Director may entrust Deputy Directors with a part of his/her responsibilities when Deputy Directors are nominated to the NAHPI.)
- 2) Research
 - a) Bacteriology Section
 - b) Virology Section
 - c) Parasitology Section
 - d) Pathology Section
 - e) Biochemistry Section
- 3) Managing and Planning
 - a) General Affairs
General affairs, personnel, accounting, procurement, maintenance, etc.
 - b) Planning and Coordination
Planning and coordination of surveys, diagnosis, researches and assessments.
 - c) Training and Extension
Technical extension (training, extension of printed matters and materials for laboratory use, etc.)
 - d) Information
Statistics, publication, printing and library.

1-3 DISPATCH OF BASIC DESIGN TEAM

Based on the results of the Preliminary Study previously outlined, the Government of Japan dispatched a Basic Design Study Team (the B/D Team) headed by Dr. Hiroyuki Yuki and organized by JICA to Thailand from September 19 to October 9, 1984.

After learning about conditions in the livestock industry, the current situation of research activities related to animal health in Thailand and the laboratory services and animal health researches currently being conducted at the DLD, the B/D Team also made detailed studies of the background of the proposal for the Project and the fields and character of animal health diagnosis and research activities that the DLD wished to conduct through the NAHPI, to confirm and study specific roles, types of activities, social needs and their relative importance.

The B/D Team heard a general outline of animal health activities from a JICA expert assigned to encourage provincial animal health service projects in Thailand, and visited the northern Regional Veterinary Diagnostic Laboratory Center (Khon Kaen), the Veterinary Biologics Production Center and Foot-and-Mouth Disease Vaccine Production Center (both at Pak Chong), the Pig Breeding Station (Bankhen), Laboratories in the DLD itself, etc., in order to make in-depth studies of the roles of examination, research, and diagnostic activities conducted by these organizations. They also examined how tasks are allocated to each organization, studied related regulations and collected information and statistical data.

As a result of these studies, the B/D Team concluded that there was an urgent need for the central organization, namely the DLD, to make intensive efforts to raise its technological level, especially in research and training, in order to strengthen its control over, cooperation with, and technical assistance to, the local organizations.

It was also ascertained that DLD is the most appropriate and adequately equipped body to function as the implementing organization for this Project.

On this basis, the B/D Team reached an agreement with the DLD on the objectives and activities of the NAHPI. Those items confirmed by the discussions were summarized in the Minutes of Discussions on

the Establishment Project of the NAHPI in Thailand dated September 28, 1984 and signed by both parties. (Please refer to Appendix (1)).

Then, JICA made further detailed studies in Japan on the research activities, size, construction schedule and construction costs for the Project, etc., and compiled the results into the Report of the Basic Design Study (draft of the final report), and conducted a confirmation Study in Thailand from December 18 to 25, 1984. The Team met with the authorities in Thailand to present the Report of the Basic Design Study (draft) and confirm its contents and the issues discussed at the time of the Basic Design Study. As a result, the two parties reached agreement on the Report of the Basic Design Study (draft) and exchanged the Minutes of Discussions, on December 25, 1984. (Refer to Appendix (2)).

CHAPTER 2: BACKGROUND OF THE PROJECT

CHAPTER 2: BACKGROUND OF THE PROJECT

2-1 THE FIFTH NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN (1982 -1986)

2-1-1 General Policies

(1) Policies

The Fifth National Plan commenced in October 1981 with the following six policies:

1. To emphasize the adjustment of economic structure rather than economic growth.
2. To work towards equalization of the national economy and social development.
3. To alleviate poverty in rural areas.
4. To make adjustments of economic development, social development and national security.
5. To coordinate the implementation of the Plan.
6. To integrate carefully the role and cooperation of the private sector.

(2) Objectives

The plan holds the following six major national development objectives as its specific targets:

1) Recovery of National Economic and Financial Status

To encourage saving and to demand efforts for the elimination of waste from the public and private sectors as a means of reducing deficits in the balance of trade and the budget, and to increase government revenue. To seek the enhancement of economic efficiency and productivity so as to expand exporting capacity by improving the economic structure and promoting efficiency in the utilization of national resources.

2) Adjustment of Economic Structures and Improvement of Economic Efficiency

To reinforce the capacity for economic independence to cope with worldwide economic changes as well as to secure higher incomes and employment rates for people in rural areas and to diffuse economic activities in these rural areas. To realize an annual growth rate of 4.5% in agriculture by increasing the annual crops for the principal farm products by 4.0%. To bring about an annual growth rate of 7.6% in industry in general, and of 15% in the exporting industries in particular. To suppress the annual rate of increase in oil consumption to 4.8% and to decrease the annual importation of oil by 3%. To seek the diffusion of economic activities in rural areas, and especially to encourage basic industries on the Eastern Seaboard.

3) Development of the Social Structure and Distribution of Social Services

To develop a social structure capable of sustaining economic change. To decrease the annual population growth to 1.5% by 1986, and to improve the educational system so as to upgrade the economic, cultural and ethical standards of the people for the foundation of an orderly, cultural and ethical society. To reduce differentials in social

services such as education, health preservation and medical treatment between rural and urban areas in order to improve the regional standard of living.

4) Poverty Alleviation in Backward Areas

To designate 216 districts and 30 sub-districts in the Northeast, North and South as target areas for the extension of education, training, health services and living necessities. To carry out projects for developing fishery and water resources, establishing district hospitals, improving the soil, and raising the annual growth rate from 1% to 2%.

5) Adjustment between Economic Development Activities and National Security Management

To increase the defense capability and efficiency of national security management with an effective disbursement of the national defense budget. To promote economic and social development in areas that are security-sensitive and depressed in terms of national security.

6) Reformation of Development Administration and Diffusion of Ownership

To carry out the necessary reform of the national development administration and management system on central as well as local levels and to obtain cooperation from the private sector, so that the Plan may be efficiently carried out by all concerned. To decrease the concentration of ownership of capital and land so that ownership is more widely diffused.

The following figures have been drawn up as targets for the above economic development. (see Table 2-1 (a)).

Table 2-1 (a) Major Indices of Macroeconomy

	4th National Program	5th National Program
1. Deficit in Balance of Trade (current value)		
1.1 Annual Average Deficit	45,300	78,400
1.2 Ratio to GDP (%)	7.6	5.9
2. Deficit in Balance of Current Account		
2.1 Annual Average Deficit	37,400	53,000
2.2 Ratio to GDP (%)	6.3	4.1
3. Export of Merchandise & Service		
3.1 Rate of Increase of Total Amount (% per year)	23.7	21.9
3.2 Rate of Increase of Quantity (% per year)	12.1	10.9
4. Export of Merchandise		
4.1 Rate of Increase of Total Amount (% per year)	21.9	22.3
4.2 Rate of Increase of Quantity (% per year)	10.5	11.3
4.3 Annual Average Amount of Export (% per year)	110,900	309,400
5. Income from Tourism		
5.1 Rate of Increase of Total Amount (% per year)	36.2	21.5
6. Import of Merchandise & Service		
6.1 Rate of Increase of Total Amount (% per year)	25.4	18.1
6.2 Rate of Increase of Quantity (% per year)	10.1	7.2
7. Import of Merchandise		
7.1 Rate of Increase of Total Amount (% per year)	26.3	18.1
7.2 Rate of Increase of Quantity (% per year)	10.9	7.3
7.3 Annual Average Amount of Import	156,200	387,800
8. Rate of Growth for Respective Sectors (% per year according to fixed price)		
8.1 Agriculture	3.5	4.5
8.2 Manufacturing Industry	9.3	7.6
8.3 Mining Industry (including Natural Gas)	12.6	16.4
8.4 Natural Gas (Daily Production 1 million P ³)	200 (1981)	525 (1986)
8.5 Gross Domestic Product (GDP)	7.3	6.6
9. Rate of Increase of Demand (% per year according to fixed price)		
9.1 Private Sectors	7.3	5.2
Consumption	6.2	4.8
Investment	12.0	6.9
9.2 Public Sectors	9.3	6.8
Consumption	8.5	7.9
Investment	11.0	4.9
10. Saving/Investment (% to GDP)		
10.1 Saving	23.1	27.0
Public Sectors	1.5	4.3
Private Sectors	21.6	22.7
10.2 Investment	29.4	31.1
Public Sectors	7.9	8.1
Private Sectors	21.5	23.0
11. Public Finance Income (% to GDP)	14.0 (1984)	18.0 (1986)
12. Rate of Increase of Population (%)	2.1 (1984)	1.5 (1986)
c.f. Rate of Increase of GDP Deflator (%)	11.2	10.6

(Source: The Fifth National Economic and Social Development Plan, 1982 - 1986)

2-1-2 Policies Related to Agriculture

(1) Basic Policies

In the Fifth National Economic and Social Development Plan (1981-1986), agriculture is singled out as one of the most important industries in Thailand in which the Government's policy is improve the organization and raise the productivity.

The following is an outline of the present agricultural industry, indicating the targets of the above-mentioned policies including those related to the livestock industry in Thailand.

1) Present situation of the agricultural sector

The national income in the agricultural sector is 25% of the total national income. On the other hand, the total working population in this sector, about 15.6 million, is about 70% of whole the working population. The agricultural sector is contributing largely to exports, accounting for about 60% of the total.

During the past twenty years, agricultural output has expanded at the rather high rate of five percent per annum, as compared with the world's agricultural growth rate of only 2.5-2.8 percent per annum.

The characteristics of the agricultural industry in this country are summarized as follows:

- a) Agriculture has diversified into many new cash crops in order to satisfy domestic and export demand. Furthermore, livestock, fishery and forestry development has been carried out.
- b) The extension of the Government's infrastructural services during the period of the four previous plans has greatly contributed to the rise in agricultural

output, particularly in the development of water resources, expansion of the irrigation system to cover 16 million rai out of 84 million rai of paddy land, and the expansion of the road networks between production and marketing locations to reach 60,000km in agricultural areas all over the country.

c) Such expansion of output has mainly been related to the expansion of the cultivated area. The cultivated area has been expanding at an annual rate of approximately four percent to reach 147 million rai at present, including 84 million rai of paddy land. It is evident that expansion of the land frontier is now nearly ended, since suitable land for agriculture is running out.

d) Crop growing, animal production and fisheries are the important fields of farming. In crop growing, the water used is mostly rain water, so the harvest is easily affected by climatic conditions. A long drought will affect the harvests in the northern and northeastern regions and floods will do so in the central and southern areas.

In this country, it is very rare for agriculture to be blessed with ideal weather, and prolonged drought or floods will drive the agricultural economy into an extremely difficult situation.

For agriculture, there are factors other than natural conditions that are hard to foresee. For example, in 1981, there was good weather for farmers, and paddy rice and various field plants enjoyed a good harvest. Despite this, the price of agricultural products fell because of the excess supply to the domestic market and limited acceptance in foreign markets.

The ratio of absolute poverty has declined from 50% of the total population in 1961 to about 25% at present. This was apparently a result of effective agricultural development. In the future, the Government of Thailand will further endeavor to improve the agricultural organization to correct the income disparity between agriculture and other economic sectors and between regions.

2) Growth Target and Plans in the Agriculture Sector

At present, the state of agriculture in this country has become severe and may cause the agricultural growth rate to slow down to about 3.5% during the period of the Fifth Plan.

As one measure to improve the unstable agricultural structure and develop agricultural productivity, agricultural development including the encouragement of the livestock industry will be carried out. The detailed policies are as follows:

a) Encouragement of double cropping

Targets for paddy productivity by region are:

	1981	1986
First crop (kg/rai)		
Northeast	224	293
South	385	290
Center	302	320
North	343	355
	1981	1986
Second crop (kg/rai)		
Northeast	500	500
South	480	480
Center	564	625
North	490	490

Targets for the yields of major crops during the Fifth Plan period are:

	Yield kg/rai		Average growth rate
	1981	1986	1982 - 1986
1. Paddy	290	336	3.0
- First crop	272	312	2.8
- Second crop	550	600	1.7
2. Rubber	66	130	9.7
3. Maize	309	420	6.3
4. Sugar cane (ton/rai)	6.8	7.7	2.5
5. Tobacco	152	172	2.5
6. Mungbean	100	130	5.4
7. Sorghum	192	241	4.7
8. Castor bean	140	150	1.4
9. Soybean	150	229	8.9
10. Groundnut	186	208	2.4
11. Cotton	191	250	5.6

b) Diversification of the crops

The Government will promote the use of new varieties of rice, rubber, cassava, maize, fruit, sugar-cane, tobacco, ground nuts, and soybeans, taking into consideration both the potential of each area and market trends.

Apart from the promotion of major economic crops, the Government will also promote the cultivation of other crops, such as tea, coffee, cocoa, coconuts and palm oil, etc.

c) Demarcation of crops and livestock

Formulation and demarcation of agricultural economic zones for crops and livestock, taking into consideration soil quality, market trends, and farmers' capabilities and incomes.

d) Encouragement of livestock industry

The majority of cattle, buffalo, poultry are owned by the traditional sector (poor peasants, smallholders, medium-scale farmers), but there is successful commercial ownership and aggressive exploitation of pig and poultry breeding. The Government of Thailand has encouraged animal breeding for farmers to improve the unstable foundation of the agricultural industry and to free themselves from their present heavy dependence on natural conditions, and susceptibility to unfavorable circumstances (drought, flood, damage by blight and harmful insects, unseasonable weather, etc.); and also so that farmers can increase their incomes. The Government of Thailand is setting up agrarian reform plans affecting ten million poor farmers in 37 provinces in its Fifth Year Economic and Social Development Plan.

Basic policies for the commercial sector (including medium-scale and intensive large-scale farmers) and traditional sector are as follows:

Government Policies

Sector	Policies
Commercial Sector	<ol style="list-style-type: none">1) The provision of a system of national disease surveillance and preventive medicine service so that the disease risks to commercial livestock of high productivity can be minimized:2) The improvement of the disease control aspects of export procedures to achieve international confidence in livestock products. This includes the establishment and maintenance of cost-effective disease-free zones.
Traditional Sector	The prevention of production decreases caused by animal diseases by the surveillance, diagnosis and active prevention of animal diseases throughout the nation, and the elevation of the standard of living of farmers by shipping their excess products.

The overall growth targets are as follows:

Crops to expand by 4.7 percent per year

Livestock to expand by 4.2 percent per year

Fishery to expand by 5.4 percent per year

Forestry to expand by 0.3 percent per year

2-2 CURRENT STATE OF LIVESTOCK INDUSTRY IN THAILAND

2-2-1 General Conditions

There are approximately 4.5 million cattle, 5.4 million buffalo, 4.9 million swine, 80 million poultry and some elephants and horses in Thailand. There appears to have been a stagnation in the increase of cattle and buffalo in the last decade, and swine have not increased in numbers, but there is a wide fluctuation between years. The number of chickens have declined following a peak in 1979.

Livestock is a valuable source of protein for the Thai people, and of foreign currency through exportation.

(Refer to Tables 2-2 (a) and (b)).

(1) Cattle and Buffalo

The northeast has traditionally bred cattle and draft buffalo (about 40% of all the cattle and about 60% of all the buffalo in Thailand). Commercial breeding has been developed by the commercial sector. (Refer to Table 2-2 (c), and to the appendices of this report showing the cattle and buffalo breeding distribution in Thailand.)

Table 2-2 (a) Numbers of Livestock Raised (1,000 head)

Year	Cattle		Buffalo		Swine		Ducks		Chickens	
	A/c	B/d	A/c	B/d	A/c	B/d	A/c	B/d	A/c	B/d
1971	4,830	4,460	5,820	5,574	5,476	3,884	7,194	<u>/b</u>	61,437	<u>/b</u>
1972	4,365	4,485	4,930	5,361	4,573	3,982	7,281		62,782	
1973	4,358	4,093	5,546	5,546	4,214	4,510	15,525		45,682	
1974	4,204	4,150	5,743	5,642	3,532	3,846	13,647		44,587	
1975	5,433	4,142	5,516	5,597	4,550	3,548	13,661		40,504	
1976	4,144	4,322	5,248	5,895	3,043	3,404	13,420		43,758	
1977	4,127	4,314	5,099	5,827	3,536	3,275	17,684		46,146	
1978	4,990	4,437	6,021	5,959	4,247	5,324	22,405		48,846	
1979	5,918	4,276	6,012	6,028	4,159	3,396	20,619		75,195	
1980	4,563	3,938	5,909	5,651	4,014	3,021	22,505		64,700	
1981	4,335	<u>/a</u>	5,427	<u>/a</u>	4,926	<u>/a</u>	58,882		21,945	
1982	4,491	<u>/a</u>	5,388	<u>/a</u>	4,927	<u>/a</u>	<u>/a</u>		<u>/a</u>	

/a Not available

/b Not recorded

/c Source A. DLD

/d Source B. Agricultural Statistics of Thailand - Crop Year 1980/81.

Table 2-2 (b) Amount of Export and Import of Animals and Animal Products (million Baht)

	1976	1977	1978	1979	1980
Exports					
<u>Live animals</u>					
Cattle	47.9	106.5	113.6	104.7	64.3
Buffalo	99.3	108.7	137.8	104.1	34.5
Hogs	6.3	0.7	5.0	10.1	0.03
Poultry	10.9	8.3	17.0	11.9	42.7
Others	7.9	8.9	18.5	17.7	23.2
<u>Livestock products</u>					
Hides, skins, leather	177.1	231.8	295.8	478.9	260.0
Meat, fresh and prepared	76.9	168.9	442.4	570.0	671.5
Feathers, bones, horns	149.7	239.1	207.6	299.2	292.7
Eggs	38.9	74.7	37.2	21.6	12.0
Milk and cream	60.8	68.2	110.0	144.7	160.8
Miscellaneous	16.8	24.6	51.6	85.3	102.6
Total	692.5	1,040.4	1,436.5	1,848.2	1,664.33
Imports					
<u>Live animals</u>					
Cattle	6.5	1.7	25.3	12.6	1.4
Buffalo	0.2	0.3	0.5	2.2	0.5
Pigs	2.9	16.1	12.9	4.0	8.8
Poultry	25.2	30.4	52.9	76.6	91.0
Others	1.6	1.5	8.2	9.8	11.7
<u>Livestock products</u>					
Meat, fresh and prepared	4.5	6.0	6.6	13.7	11.9
Animal oil and fats	55.3	89.4	98.1	107.0	105.0
Hides, leather	2.3	6.4	24.5	62.6	118.3
Dairy products	654.6	881.8	973.7	1,203.0	1,314.7
Total	753.1	1,033.6	1,202.7	1,491.6	1,663.3

/a Consolidated from Agricultural Statistics of Thailand.

Table 2-2 (c) Regional Breeding of Cattle and Buffalo

Region	Cattle		Buffalo	
	Head	%	Head	%
North	989,644	23.1	1,389,874	22.2
Northeast	1,732,828	40.0	3,838,441	9.3
Central	787,684	17.7	261,919	9.3
South	794,819	18.6	289,657	4.7
Total	4,275,842	100.0	6,027,988	100.0
	(1978/1979)		(1979/1980)	

The domestic supply of beef cattle and dairy cows is not satisfactory because of insufficient development of pastures, lack of feed in the dry season and unskillful breeding. A small dairy industry based on crossbred indigenous and exotic animals is in the central area of Thailand. Only 5% of domestic fresh milk requirements are satisfied. The country is heavily dependent upon imported milk and dairy products. (See Table 2-2 (b)).

Buffalo accounted for about 60% of the total cattle and buffalo population. Their uses are shown in Table 2-2 (d).

These cattle are sent to slaughter in Bangkok when they become suitable for work. The demand of meat is increasing and the supply is insufficient.

In 1979, a "buffalo bank" was established for smallholders. The bank had about 2,300 head in 1982 and hired them out at 700 bahts per buffalo.

Table 2-2 (d) Types and Uses of Cattle and Buffalo

	Kind	Use
Buffalo	Swamp Buffalo	Draft in paddies and farms, meat, animal products
	River Buffalo	Dairy, draft, meat
Cattle	Bos Indicus	Beef and draft
	American Brahman	Improved species for beef
	Bagkala (or Bagkalo)	Dairy
	Holstein Freisian	Improved species for daily purposes

(2) Pigs

The production of pigs in Thailand satisfies around 70% of the country's demand. Pigs are raised under both backyard and intensive systems. The latter is supported by the technically advanced feed industry, joint ventures with foreign firms and resident Chinese firms. Smallholders and medium-scale breeders supply more than 70% of the total amount of production.

(See Table 2-2 (e)).

Table 2-2 (e) Ownership of Pigs in Thailand (1,000 households)

Region	Herd size (head)				
	1 - 4	5 - 19	20 - 99	100 - 400	500
Center	125	62	18	1.7	0.14
North	344	68	7	0.2	0.01
Northeast	363	59	6	0.2	0.01
South	170	37	3	0.04	0.001
Total	1,002	225	33	2.1	0.2
Percentage of households	79	18	2.7	0.2	0.01
Production system	Smallholder		Private commercial	Intensive company	
Hogs <u>/b</u>	1,202,400		2,580,000	660,000	
Percentage of pigs <u>/b</u>	27		58	15	

/a 1978 data from DLD.

/b Assuming an average of 1.2 pigs per smallholder, 10 per private commercial farm, and 300 per intensive company.

(3) Poultry

The production of poultry in Thailand is mainly of chickens. In this country more than 70% of farmers are raising poultry in pastures for their own eggs and meat. On the other hand, there are two methods of intensive production of broilers: that by the feed mix firms and that by contract feeding in fully equipped plants. The weekly production of broilers is about six million, and accounts for more than half of the amount sold in the main markets. Domestic demand is exceeded and around two million chickens are exported.

(4) Current Conditions in the Feed Industry

Nutrition is one of the most important key constraints to livestock development in Thailand. Effective disease control would allow larger numbers of animals to survive and therefore create an even greater need for higher feed production. There is also the need to increase feed quality in order to permit successful genetic upgrading of livestock.

1) Feed supply

- Hogs and poultry are raised under both backyard and intensive systems. The latter system is served by the technically advanced feed industry. This service is best provided through the regulation of feedmix quality. Other hog and poultry producers also utilize feedmixes and concentrate to varying extents on different methods. The other ingredients mixed into such rations by farmers are usually products produced or available locally.
- Support for the farmers' own feed mixing is required in the form of research into the most appropriate means of utilizing locally available products. Such research should be centralized in order to benefit from the better facilities and more highly trained staff that can

be provided through one center. In contrast to cattle and buffalo research, regional evaluations are not required, because such variations are more controlled in the pig and poultry production system.

For efficient nutritional improvement for all livestock, a research institute with better facilities and more highly trained staff is necessary.

- Demand for feed in Thailand is shown in Table 2-2 (f). In 1980, it was reported at 4.33 million tons, mainly consisting of rice bran, crushed rice and maize. These figures for production include the farmer's own feed requirements.

Table 2-2 (f) Demand for Feed (1,000 tons)

	1979	1980	1981	1982	1983	1984
Demand feedstuffs	3,812	4,330				
Rice bran	1,250	1,420				
Crushed rice	830	1,010	3,066	3,623		
Maize	900	990	940	968	997	1,004
Soybean cake	120	150				
Fish meal	122	140				
Others	240	620				
Feed additives	-	-	-	-	-	212

(Source: DLD)

- The number of feed production companies and their production amounts are shown in Table 2-2 (g).

Table 2-2 (g) Number of Registered Companies and Production Amount

Companies	Numbers				Production (million tons)			
	Year							
	1980	1981	1982	1983	1980	1981	1982	1983
(Producers)								
Feedmix	27	32	32	33	1.43	1.56	1.57	1.65
Fish meal	73	78	84	95	0.22	0.25	0.24	-
Soybean and Peanut meal	15	26	25	21	0.04	0.04	0.04	-
Premix	-	-	-	19	-	-	-	0.002
(Importers)								
Soybean and Peanut meal	-	-	-	41	-	-	-	-
Premix	-	-	-	59	-	-	-	0.006
(Dealers)								
Feedmix + Premix	2,711	3,023	3,023	3,325	-	-	-	-

• Production amounts from main feed production companies are shown in Table 2-2 (h).

Table 2-2 (h) Production of Feed and Feed Materials (1,000 tons)

		1978*	1979*	1980*	1981*	1982*	1983**
Amount of Feed Production		1,154	1,200	1,433	1,543	-	4,000
Materials	Rice bran	92	96	115	125	-	-
	Crushed rice	58	60	72	78	-	-
	Maize	519	540	644	702	-	-
	Fish meal	104	108	129	140	-	-
	Other	381	396	473	498	-	-
	Premix	-	-	-	-	-	12

* Figures indicate actual amounts

** Figures indicate required amounts

The names of the companies that account for 75% of the total production, and their shares of production are shown in Table 2-2 (i). Many firms are related to Charoen Pokpan (C.P. Group), and run broiler plants. The total production capacity of the 32 registered companies is about 2,500 thousand tons per year.

Table 2-2 (i) Principal Feedmix Companies and Production Capacity

Name of company	Capacity/hour	Day	Month
Bangkok Feed Mill Co., Ltd.	50	1,000	33,000
Bangkok Livestock Processing	50	400	4,200-8,500
Laem Thong Corporation	40	300-350	10,000-12,000
Central Food Products	40	400-430	10,000
Betagro	30	400	8,000-9,000
Charoen Pokphand Industry	20	350-400	8,000
CP, Feedmill	25	350	8,000
Thai Feed Mills Co., Ltd.	15	360	9,000
Krung Thai Feed Mill Co., Ltd.	50	800	20,000

2-2-2 Animal Diseases

(1) Animal Diseases Found in Thailand

In Thailand, various animal diseases are reported. Table 2-2 (j) lists the animal diseases of actual or potential economic importance known to exist in Thailand and neighboring countries.

The main diseases in Thailand are foot-and-mouth disease, fowl and avian diphtheria, rabies, Aujeszky's disease, swine fever or hog cholera, swine erysipelas, atrophic rhinitis, melioidosis, influenza and para-influenza, foot rot, leptospirosis, toxoplasmosis, Newcastle disease, avian infectious bronchitis, avian laryngotracheitis, infectious coryza, chronic respiratory disease, avian encephalomyelitis, duck virus hepatitis, duck plague, Marek's disease, coccidiosis, anthrax, blackleg, hemorrhagic septicemia, fowl cholera, salmonellosis, bovine tuberculosis, brucellosis, mastitis, avian leucosis, anaplasmosis, babesiosis fluke, theileriosis, trypanosomiasis, bovine cysticercosis, swine cysticercosis and distomatosis (liver fluke).

In addition, diseases of cattle other than brucellosis and leptospirosis which may have important effects on the calving rate are unrecorded in both Thailand and its neighbors. These include vibriosis, trichomoniasis and infectious bovine rhinotracheitis.

Some diseases of potential importance are either unrecorded in Thailand or else no information exists. Of these categories, the following are recorded from one or more neighboring countries: malignant catarrhal fever, mucosal disease, contagious bovine pleuropneumonia, scrapie, contagious caprine pleuropneumonia, avian tuberculosis, and Johne's disease.

Table 2-2 (j) Animal Diseases Known to Exist in Thailand and Neighboring Countries and Having Actual or Potential Economic Importance

Disease	Thailand	Kampuchea	Laos	Burma	Malaysia Peninsular	Disease	Thailand	Kampuchea	Laos	Burma	Malaysia Peninsular
Foot-and-mouth Disease	+	+	+	+	+	Avian infectious bronchitis	+	-	+	?	+
Virus O	+	0	+	+	+	Avian laryngo-tracheitis	+	+	?	?	+
Virus A	+	0	0	+	-	Infectious coryza	+	-	+	+	+
virus C	-	0	0	0	(1973)	Chronic respiratory disease	+	-	+	+	+
Virus Asia 1	+	0	0	+	-	Avian encephalomyelitis	+	-	?	-	+
Virus SAT 1, 2, 3	-	0	0	-	-	Duck virus hepatitis	+	-	0	+	0
Rinderpest	(1959)	+	(1966)	(1957)	-	Duck plague	+	0	0	0	0
Malignant catarrhal fever	-	0	-	-	+	Marek's disease	+	-	+	+	+
Mucosal disease	-	0	-	+	-	Coccidiosis	+	+	+	+	+
Infectious bovine rhinotracheitis	-	0	-	?	-	Anthrax	+	+	+	+	(1976)
Contagious bovine pleuropneumonia	-	+	?	+	-	Blackleg	+	+	-	+	+
Fowl pox and avian diptheria	+	+	+	+	+	Haemorrhagic septicemia	+	+	+	+	+
Rabies	+	+	+	+	+	Fowl cholera	+	+	+	+	+
Aujeszky's disease	+	-	+	?	+	Salmonellosis vibriosis (genital)	0	-	-	?	-
Swine fever (or hog cholera)	+	+	+	+	-	Trichomoniasis	0	-	-	?	-
Swine Erysipelas	+	+	+	+	(1976)	Bovine tuberculosis	+	+	+	+	+
Atrophic rhinitis	+	-	-	+	(1977)	Avian tuberculosis	?	0	?	+	-
Melioidosis	+	0	-	+	+	John's disease	-	0	?	+	+
Influenza and para-influenza	+	-	-	?	(1977)	Brucellosis					
Bluetongue	-	0	-	0	(1979)	Br. abortus	+	0	+	+	+
scrapie	-	-	-	+	0	Br. melitensis	+	0	?	+	+
Contagious pustular dermatosis of sheep	-	-	?	+	+	Br. suis	+	0	?	+	+
Foot rot	+	-	-	+	-	Mastitis	+	+	+	+	+
Contagious caprine pleuropneumonia	-	0	-	+	-	Avian leucosis	+	-	+	+	+
Leptospirosis	+	-	?	+	+	Anaplasmosis	+	0	?	+	+
Toxoplasmosis	+	-	?	0	?	Babesiosis	+	0	?	+	+
Newcastle disease						fluke					
Velogenic virus	+	+	+	+	+	Theileriosis	+	0	+	+	+
Mesogenic virus	+	0	0	0	+	Trypanosomiasis	+	+	+	+	(1978)
Lentogenic virus	0	0	0	0	+	Bovine cysticercosis	+	+	+	+	-
Fowl plague	-	+	+	+	-	Swine cysticercosis	+	+	+	+	-
						Sheep hydatidosis	-	0	0	+	-
						Bovine hydatidosis	0	+	+	+	-
						Distomatosis (liver fluke)	+	+	+	+	+

Legend:

- + Present
- not recorded
- ? suspected
- 0 no information available
- (19_) year of last recorded outbreak

Source: Summarized from the FAO/WHO/OIE Animal Health yearbook for 1981 using the same sequence of presentation

(2) Incidence of Endemic Animal Diseases

Table 2-2 (k) shows the incidences of some animal diseases endemic in Thailand, according to studies by the DLD. Nutrition has an important effect on incidence. Hemorrhagic septicemia occurs in both cattle and buffalo, and trypanosomiasis in buffalo in the northeast.

The morbidity and mortality rates for six diseases -anthrax, hemorrhagic septicemia, blackleg, foot-and-mouth disease, swine fever and swine plague - are shown in Table 2-2 (1).

Data on the distribution of anthrax and hemorrhagic septicemia in 1983 and 1984 are shown in Appendix (4)-3) of this report.

In broad terms, the figures appear to confirm that anthrax, hemorrhagic septicemia, blackleg and swine fever are fatal diseases. Foot-and-mouth disease in cattle and buffalo is primarily a debilitating disease but causes a relatively high mortality in young swine. In specific terms, the figures are not reliable enough for analysis. When government field staff are instructed to give priority to foot-and-mouth disease, their time becomes fully occupied and other diseases may be under-reported.

(3) Restraints on Genetic Improvement

The commercial livestock sector has introduced disease control measures for swine and poultry management systems which enable pure-bred exotic stock to survive. The domestic buffalo is well adapted. Genetic improvement apparatus for beef production poses either minor or no disease problems as long as *Bos indicus* breeds are used. However, there are serious disease problems relating to the introduction of *Bos taurus* breeds as the basis for development of a milk industry.

Twenty out of 21 brown Swiss cattle died following importation in 1961. Heavy mortality in pure-bred exotic dairy cattle was later experienced in the Thai-Danish and Thai-German projects. A private importation of 400 animals from Australia resulted in an almost 100% mortality in 4 years despite attempts to control tick diseases.

The major disease challenge has come from three hemoparasitic diseases (anaplasmosis, babesiosis and theileriosis) and foot-rot. Trypanosomiasis has been a complication in the north and northeast. At present there is almost no knowledge concerning the distribution, prevalence and incidence of the four hemoparasitic diseases and their vectors.

(4) Restraints to Marketing

In past, cattle and buffalo have been produced within a Disease-Free Zone (DFZ) in the south. In 1980, as a result of the appearance of foot-and-mouth disease in the DFZ, the amount of exports has decreased and exports to Malaysia have been suspended, with marked effects on the international economy. At present, conditions have improved and exports from the DFZ have been restarted.

Contagious bovine pleuropneumonia is recorded both in Burma and Kampuchea but not in Thailand. If discovered in Thailand, the disease would adversely affect both the movement of cattle within the country and their export. The level of illegal movements of livestock from Burma over the years makes the introduction of the disease a possibility.

(5) Economic Impact of Animal Disease

At the present time the epidemiological data available is grossly deficient as a basis for making an overall assessment of animal diseases as a restraint to production. On current information, and extrapolating from situations in other

developing countries, foot-and-mouth disease in cattle, buffalo and hogs, hemorrhagic septicemia in cattle and buffalo, swine fever (hog cholera) and Newcastle disease in poultry, probably deserve priority attention. However, there is the probability that chronic diseases causing infertility or debility will be found to have a greater long-term economic importance. The priority for analysis is foot-and-mouth disease.

(6) Veterinary Public Health

Veterinary Public Health is that part of disease control activity related to diseases communicable to man (zoonoses). The DLD has sophisticated equipment for the examination of meat intended for export. Information on the prevalence of meat-borne diseases is sparse but trichinosis is said to be important in the northern hill tribes.

Rabies in dogs is endemic in the whole of Thailand and the Government estimates that there are more than 300 human fatalities a year.

Table 2-2 (k) Incidences of Some Animal Diseases Obtained by the Diagnostic Laboratories from Field Samples in 1981/82

Laboratory	Disease	Animal	No. of Samples	No. of positive	% positive
<u>Northeastern</u>	Brucellosis	Buffalo	696	5	0.7
		Cattle	718	49	6.8
		Pig	360	2	0.5
	Fascioliasis	Buffalo	3,493	953	27.3
		Cattle	1,2238	210	17.0
	Trypanosomiasis (<u>T. evansi</u>)	Buffalo	1,206	121	10.0
		Cattle	180	5	2.8
		Horse	234	42	17.9
	<u>Southern</u>	Brucellosis	Buffalo	184	0
Cattle			1,606	16	1.0
Swine			993	43	4.3
Fascioliasis		Buffalo	74	6	8.1
		Cattle	561	113	20.1
Trypanosomiasis		Cattle	1,163	0	0.0
Theileriosis		Cattle	1,163	1	0.08
		Cattle	1,163	191	16.4
<u>Northern</u>	Brucellosis	Buffalo	1,049	47	4.5
		Cattle	1,373	174	12.7
	Fascioliasis	Buffalo	821	34	4.1
		Cattle	913	17	1.9

(Source: DLD)

Table 2-2 (1) Reported Numbers of Animal Disease Outbreaks, with Recovery and Death Rates

Disease	Year	No. of out-breaks	Cattle		Buffalo		Pigs	
			Recovery	Death	Recovery	Death	Recovery	Death
Anthrax	1977	6	-	N 18	-	-	-	-
	1978	8	-	11	-	-	-	-
	1979	5	-	4	-	5	-	-
	1980	6	-	8	-	13	-	-
	1981	10	-	16	-	10	-	-
	1982	3	-	8	-	6	-	-
Hemorrhagic septicemia	1977	167	-	143	-	414	-	-
	1978	127	3	164	50	477	-	-
	1979	71	4	30	-	191	-	-
	1980	87	4	42	-	212	-	-
	1981	318	-	70	-	740	-	-
	1982	69	4	62	13	258	-	-
Blackleg	1977	1	-	9	-	-	-	-
	1978	-	-	-	-	-	-	-
	1979	-	-	-	-	-	-	-
	1980	-	-	-	-	-	-	-
	1981	-	-	-	-	-	-	-
	1982	1	-	6	-	-	-	-
Foot-and-mouth	1977	123	6,814	11	6,076	2	8,892	539
	1978	207	7,872	5	2,518	9	1,316	71
	1979	302	30,179	17	6,269	-	1,708	54
	1980	934	30,982	166	57,760	12	2,576	220
	1981	190	14,032	97	7,674	22	960	128
	1982	94	8,842	11	3,793	2	508	20
Swine fever (hog cholera)	1977	31	-	-	-	-	16	1,130
	1978	37	-	-	-	-	-	844
	1979	4	-	-	-	-	-	17
	1980	4	-	-	-	-	-	-
	1981	3	-	-	-	-	238	291
	1982	-	-	-	-	-	-	-

Source: DLD

2-3 **EXISTING ORGANIZATION AND ACTIVITIES CONCERNING ANIMAL HEALTH IN THAILAND**

(1) Administrative organization and activities of DLD

The DLD is responsible for all aspects of livestock production and animal health except for the veterinary public health service in Bangkok and the countrywide animal inspection system controlled by the Ministry of Public Health.

The activities of the DLD in animal health are as follows:

- Animal disease control and eradication
- Initiation and coordination of programs for the improvement of livestock in the country
- Research on animal breeding, nutrition and diseases
- Vaccine, serum and antigen production for domestic use and exportation
- Registration control of veterinary practitioners and livestock traders
- Registration control of animal feed quality in Thailand

The Government of Thailand has established the Veterinary Biologics Production Center (Pack Chong), Foot-and-Mouth Disease Vaccine Production Center (Pack Chong) and three Regional Diagnostic Laboratory Centers in the north (Lam Pang), northeast (Khong Kaen) and south (Thung Song) to deal with the problems of improving animal health. Meanwhile, the endeavors of Government of Thailand to develop and expand these activities have met with reasonable success with the assistance of foreign countries. However, relatively speaking, the technical level of the DLD has not progressed so as to maintain the necessary control and give satisfactory technical assistance to the local organizations.

For the DLD, the improvement of its system as the central organization by enriching and strengthening its facilities and technology is one of the most important tasks. There is a need for better control of local activities; prompt communication of technical results accumulated centrally, efficient instruction of, and coordination with, local institutes; accurate diagnosis of animal diseases throughout the country; good training of animal health practitioners; and maintenance and strengthening of animal health survey activities in the central area.

As shown in Fig. 2-3 (a) Organization Chart of DLD, the Director General has three Deputies, one for animal health, another for animal production and the other for administration. The activities and function of main divisions under these Deputies are as follows:

1) Planning Division

This division has six sections: Administration, Budget Planning, Activity Evaluation, Economics and Marketing, Data Collection and Analysis, and International Coordination. This division assists the Director General by carrying out international coordination activities, editing and analysis of livestock statistics, project control, drawing-up of policies, etc.

2) Four divisions directly controlled by the Deputy Director General in charge of animal health and related organizations

a) Division of Disease Control

The Division has 4 sections: Administration, Disease Eradication, Animal Quarantine and Public Health.

The Division is responsible for:

- a. Prevention and eradication of communicable diseases
- b. Control of the domestic movement of animals and/or their products
- c. Control of international movement of animals and/or their products.
- d. Meat quality control for export
- e. Control of zoonoses

The organization is as follows:

- a. Veterinary field service teams having 37 staff each are disposed in each province
- b. Twenty-two quarantine centers controlling domestic movements of animals
- c. Domestic checkpoints for animal movements
- d. International checkpoints for import and export of animals

b) Division of Veterinary Service

The Division consists of 5 sections: Administration, Veterinary Supplies, Poultry Disease Veterinary Practice, Livestock Trade Registration, and Veterinary Clinics.

The main functions of the Division are:

Clinical diagnosis and outdoor services, distribution of equipment, medicines, vaccines, etc., and control of private veterinary practitioners. The Division has Veterinary Clinics in 35 provinces which diagnose and treat animal diseases.

The Regional Livestock Office (RLO) is the representative of the regional livestock industry and a coordinator of the animal production and health activities. At present, this office has

administrative responsibility and authority over regional animal disease control.

Further, the Provincial Livestock Offices (PLO) (73 offices) under the DLD's technical department are administered by District Livestock Offices (675 offices). Their work in the field is general animal disease control including vaccination.

c) Division of Veterinary Biologics

This Division produces about 50% of the rabies vaccine in Thailand. This Division has two production centers at Pak Chon. One is the Veterinary biologics production center producing vaccines and antigens. The vaccines are for: rinderpest, swine fever, Newcastle disease, fowl pox, avian infectious bronchitis, duck plague, hemorrhagic septicemia, fowl cholera, anthrax, blackleg and brucella abortus. The antigens are pullorum and brucella antigens for plate and tube tests. The mass production program of the vaccines for Aujeszky's disease and rabies is under planning in this center. Another center is the Foot-and-Mouth Disease Vaccine Production Center, which produces vaccines for diagnosis and research on this disease. This center has accepted the technical assistance of the Government of Japan.

The number of vaccine doses produced in fiscal 1979-1982 and the production targets for 1983-1986 are shown in Table 2-3 (a). Table 2-3 (b) gives the types and quantities of diagnostic reagents produced.

d) Division of Veterinary Research

This Division has 5 sections at its headquarters: Administration, Veterinary Diagnosis, Animal Health Research, Laboratory Animals, Animal Disease Investigation. This Division has a staff of about 160 including veterinarians, assistant veterinarians, livestock technicians and administrators. Its main activity is research on animal diseases, including the following:

- a. Research on production of Aujeszky's vaccine
- b. Research on production of antigens for swine chronic respiratory disease
- c. Isolation of *pasteurella multocida* from the field and the study of serotypes
- d. Research on duck enteritis
- e. Others

In addition, this division controls 3 regional centers: the Southern, Northeastern and Northern Regional Diagnostic Centers.

2-3 (a) ORGANIZATION CHART OF DLD

Fig. 2-3(a) Organization Chart of DLD (June 1954)

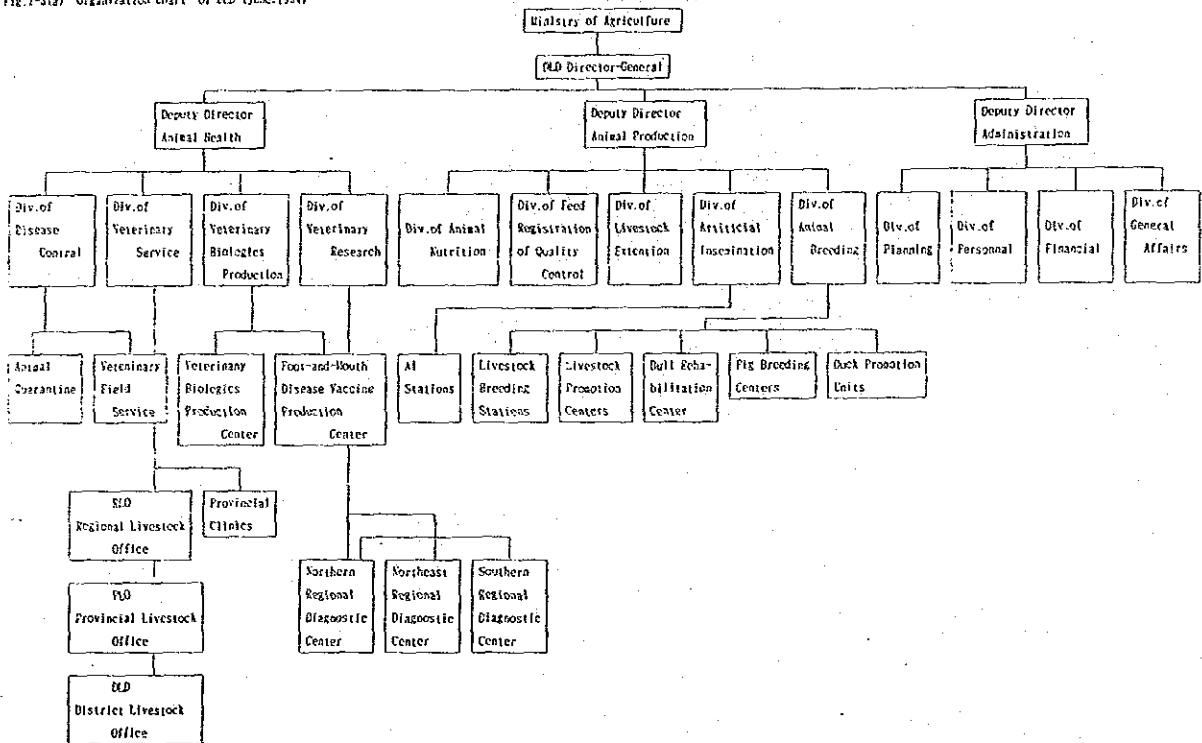


Table 2-3 (a) The Number of Vaccine Doses Produced by the Department of Livestock Development in 1979-1982 and Production Targets for 1983-1986
/a/b (millions)

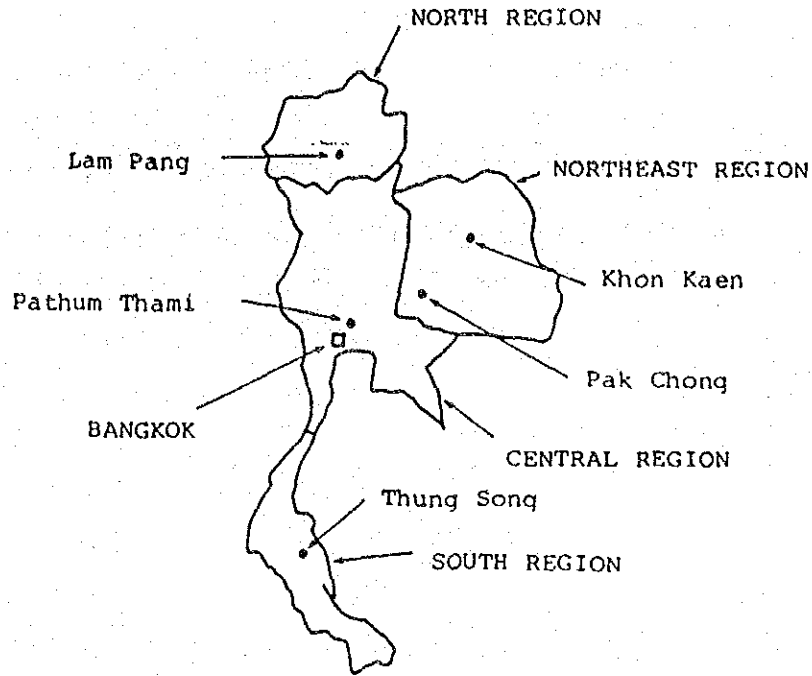
Vaccine	Production				Production Targets			
	1979	1980	1981	1982	1983	1984	1985	1986
Foot-and-mouth (cattle and buffalo)	1.1	1.2	3.4	4.1	15.0	20.0	25.0	30.0
Foot-and-mouth (swine)	0.3	0.3	1.2	1.2	3.0	5.0	7.0	10.0
Hemorrhagic Septicemia	4.3	4.6	4.6	4.6	7.0	8.0	9.0	10.0
Anthrax	.2	.2	.2	.3	0.6	0.8	1.0	1.0
Blackleg	.05	.09	.08	.06	0.2	0.3	0.4	0.5
Brucellosis	.03	.1	.1	.02	0.6	0.8	1.0	1.0
Rinderpest	0.2	0.4	.04	.3	0.6	0.6	0.6	0.6
Swine fever (Hot cholera)	1.0	1.2	1.5	1.4	3.0	4.0	6.0	6.0
Newcastle disease	88.4	117.6	100.1	92.0	140.0	160.0	180.0	200.0
Fowl pox	3.1	8.3	8.9	7.7	14.0	16.0	18.0	20.0
Infectious bronchitis	6.5	12.7	9.6	8.6	14.0	16.0	18.0	20.0
Fowl cholera	5.3	7.9	6.1	9.0	8.0	10.0	12.0	15.0
Duck plague	28.4	21.9	22.8	32.0	32.0	36.0	40.0	50.0
Total doses	138.88	176.49	158.62	161.28	238.0	277.5	318.0	364.1

/a Calculated for fiscal years ending September 30.

/b The table excludes rabies vaccine. Departmental records state that .003 and .012 million doses were produced in 1980 and 1981, respectively, but no figures are available for 1982 and no production targets are issued.

Table 2-3 (b) Types and Volumes of Diagnostic Reagents Produced by the Department for Livestock Development for the Years 1979-1982 (ml) /a

	1979	1980	1981	1982
Pullorum antigen	7,620	5,390	6,000	6,800
Brucella antigen				
- plate	26,000	13,140	21,420	2,500
- tube	5,060	8,340	10,240	7,000



THAILAND

The activities of each center are shown in Table 2-3 (c). Table 2-3 (d) gives a comparison of the number of samples received and the types of examination carried out at the diagnostic laboratories during 1981.

The activities related to the animal health surveillance and diagnosis by the centers are as follows:

a. Virology

Isolation of viruses of chickens and cattle

b. Toxicology and biochemistry

Detection of agricultural chemicals, aflatoxin and antibiotics (requiring provision of equipment and materials)

c. Epidemiology

Surveillance of animal diseases (principally brucellosis, tuberculosis, mastitis and swine encephalitis)

d. Immunology and serology

Diagnosis by sera reactions (brucellosis melioidosis, tuberculosis, atrophic rhinitis, vibriosis of bacteria and encephalitis and infection by Pulbo virus)

The names and locations of the organizations under the DLD are shown in appendices (4)-3 of this report.

Table 2-3 (c) Regional Diagnostic Centers

<p>a. Northern (Lam Pang)</p>	<p>The Laboratory is strategically situated for the surveillance of the borders with Burma and Laos. However, its operation is hampered by a lack of even basic equipment.</p>	<p>Constructed and managed the Government of Thailand.</p>
<p>b. North-eastern (Khong Kaeng)</p>	<p>There is a well defined work program which attempts to link with all other animal health activities in the northeast. A group of five villages has been chosen in each of three provinces for routine visits. These are in border provinces-one with Laos, one with both Kampuchea and Laos, and one with Kampuchea. Another group of five villages has been chosen near to the Laboratory for close and continuous surveillance. Importance is given to interpreting the results of laboratory findings to provincial and district livestock officers and to farmers and initiating control programs at the village level by farmer "self-help" program. In 1983, fourteen thousand specimens mainly buffaloes (more than half buffaloes and 1/4 cattles) are tested per year.</p>	<p>West Germany's Technical Cooperation. Parasite-farmer self-help program (by the monetary assistance by West Germany, etc.)</p> <p>No. of Staff including:</p> <p style="padding-left: 40px;">Veterinarians 15</p> <p style="padding-left: 40px;">Assistant Veterinarians 11</p> <p style="padding-left: 40px;">Technicians 7</p> <p style="padding-left: 40px;">(Total 49)</p>
<p>c. Southern (Thung Song)</p>	<p>The site of the laboratory is central within the DFZ (Disease free zone) and is an essential component for the level of surveillance that such a zone requires. As in the northeast, there is an attempt to interpret laboratory findings to Government livestock officers and farmers. At first (seven months in 1978), the number of specimens brought in was few (247 specimens). But, in 1980, it was increased up to 66,000. Average about twenty specimens per year until 1982 continuously. Inhabitants have considerable interest in rabies. The demonstration of animal health program is implemented in the main farms.</p>	<p>Technical cooperation of the Government of Japan (1977-1984)</p> <p>No. of staff including:</p> <p style="padding-left: 40px;">Veterinarians 10</p> <p style="padding-left: 40px;">Assistant Veterinarians 6</p> <p style="padding-left: 40px;">Technicians 2</p> <p style="padding-left: 40px;">(Total 55)</p>

Table 2-3 (d) Comparison of the Numbers of Samples Received and the Types of Examination Carried out at the Four Diagnostic Laboratories of the Department of Livestock Development During 1981

Section	Type of examination	Regional Animal Health Diagnostic Center			Laboratories in DLD
		North-east	North	South	
Bacteriology	Examination of fresh material	2,349	1,305	4,109	6,465
	Susceptibility to antibiotics	nil	19	56	3,268
Virology	Virus identification	439	nil	187	535
	Rabies diagnosis	234	nil	439	nil
Serology	Agglutination	1,135	6,396	7,072	3,579
	Complement fixation	nil	nil	153	1,625
	Hemagglutination	nil	47	nil	nil
	Mercaptoethanol	nil	nil	nil	1,827
Parasitology	Fecal samples, egg counts	4,061	1,826	3,767	3,262
	Blood samples, hemoparasites	567	2	2,042	994
	Ectoparasite identification	189	1	nil	2,465
	Endoparasite identification		nil	nil	nil
Pathology	Autopsies	517	98	974	934
	Histopathology	1,385	395	5,625	6,385
	Clinical pathology	814	322	2,000	nil
Biochemistry	Blood examinations:				
	hemoglobin,	nil	nil	nil	197
	cell counts	nil	nil	nil	53
	magnesium	nil	nil	nil	124
	phosphorus	nil	nil	nil	62
	calcium	nil	nil	nil	
Toxicology	nil	nil	nil	nil	62

(Source: Annual report for 1981, Veterinary Research Division, DLD.)

3) Other divisions in the DLD related to animal health

• Division of Animal Nutrition

This division carries out analytical research on proteins, lipids, and carbohydrates, etc., and inorganic substances and vitamins. The specimens are from the pulse family, agricultural and industrial wastes, bran, soil, water and sera and plants.

• Division of Animal Breeding

This division has six sections: Administration, Pigs, Small Animals, Cattle, Buffalo, and Animal Products and Meat Processing. This division carries out husbandry of superior species of animals, sorting at breeding yards, importation when necessary, crossbreeding, manufacturing of animal products and meat processing, crossbreeding of good species, research on environmental and nutritious aspects, demonstration. The division has sixteen livestock breeding stations, ten livestock breeding centers, seven bull rehabilitation centers and two pig breeding centers.

• Division of Livestock Extension

This division has four sections: Administration, Extension, Planning, and Promotion and Training. Its functions are: planning and livestock development for farmers by development officers, provision of semen of oxen and buffalo, superior plant seeds, etc. for the improvement of animals, demonstration of animal breeding, improvement of common grasses for pasture, animal distribution, preparation of information service pamphlets and support of dissemination activities.

• Division of Artificial Insemination

The division has 3 sections: Administration, Semen Collection/Preservation, Breeding/ Progency Testing. It is responsible for reporting to the Deputy Director-General on production, maintenance of a semen bank, planning and undertaking AI programs and AI research, training inseminators and providing veterinary care for inseminated animals. The Division has 41 stations and 20 AI substations.

• Division of Feed Quality Control

This division has five sections for implementing the inspection of afraxine and feeds, registration of feedmix, inspection of feed producer's plants and analysis of their products (chemical, physical, microbiological and biological aspects), viz. raw materials (soybean oil cake, rice bran, ground maize, peanut oil, bran and fish meal), feedmix and pre-mix. The laboratory's testing is limited to constituents, additives and salmonella and Afraxine.

(2) The Interrelative Role of Government and Commercial Sectors in Animal Health Activities

1) Private Sector Activities in Animal Health

A basic requirement for the commercial pig and poultry sector is to protect its heavy investment from loss by diseases. A rapid diagnosis is required when any loss of production occurs through disease. The DLD is not organized to give a complete service to this level of enterprise, and the private sector has had to take the initiative. The following are private-sector activities:

- (a) sending veterinarians and others overseas for specific training;

- (b) establishing veterinary surveillance routines;
- (c) the establishment of at least four private diagnostic laboratories equipped principally for serological diagnosis;
- (d) the importation of a range of vaccines which are either not produced by the DLD or are alternatives when DLD vaccines are thought to be suspect; and
- (e) distributing vaccines efficiently and quickly to all their enterprises and clients in a timely fashion.

Potential Contributions to Animal Health Services

In recent years, the commercial sector has had a spectacular impact on the livestock industry with new animal health care techniques and facilities essential for intensive modern pig and poultry enterprises. There is also a potential for future partnership with the Government in the development of animal health services.

- (a) Assistance in the introduction of new vaccine production technology: this especially includes foot-and-mouth vaccines that are genetically engineered or derived from peptide synthesis.
- (b) Extension of the commercial system of vaccine distribution to all farmers whether in the traditional or the commercial sector;
- (c) Assistance in diagnostic technology concerned with the foot-and-mouth and similar diseases;
- (d) Importation of economical and vaccines.

2) Correlative Roles of Government and Commercial Sectors in Animal Health Service Activities

It is necessary to distinguish between the roles of the Government and the commercial sector in animal health activities in Thailand, animal production quality control and vaccine sales.

The Government has the ability to produce effective and safe vaccines competitively with the private sector, but the improvement of quality is essential.

On the other hand, the private sector can import vaccines of types which the Government cannot produce itself, and can respond to new vaccine requirements.

It is necessary for the Government to effect the maximum utilization of vaccine production capacity and to provide inspection standards for quality control of the products. An effective distribution system reaching even small farmers is also required.

(3) Current Staff Training by the DLD

1) Veterinary training organizations in the Universities of Chulalongkorn and Kasetsart, both in Bangkok. Both have field stations outside Bangkok, specializing in dairy farming and pig production, respectively. Although both facilities teach with a clinical bias, Kasetsart has included some animal epidemiology and economics training in the curriculum, and Chulalongkorn is redesigning its curriculum to this end. Approximately 80 DVM's graduate each year.

2) Veterinary assistants are principally trained at a school forming part of the DLD complex in central Bangkok. The course lasts two years after high school and consists mainly of theoretical training in Bangkok and two months a

year training in the field at DLD offices or installations. The output of qualified personnel is 200-250 a year. In 1981-1982 students were trained for the first time at Chiang Mai in the north and Khon Kaen in the northeast, with an intake of 100 students at each site. At all three locations the training suffers from inadequate accommodation, teachers have to be borrowed part-time from other divisions, and there is inadequate contact with both animals and animal production environments.

- 3) There are current negotiations to enable veterinary assistants to enroll for extension degrees being offered at the new University of Sukothai Thammathiraj in Bangkok.
- 4) In 1981, there were 342 veterinarians, with 58 vacancies, and 1734 veterinary assistants, with 353 vacancies. The vacancies for veterinarians are filled in default by veterinary assistants who are able to work in the provinces, and who may be found occupying posts up to provincial level. Graduate veterinarians find alternative employment in the private sector and in commerce.

