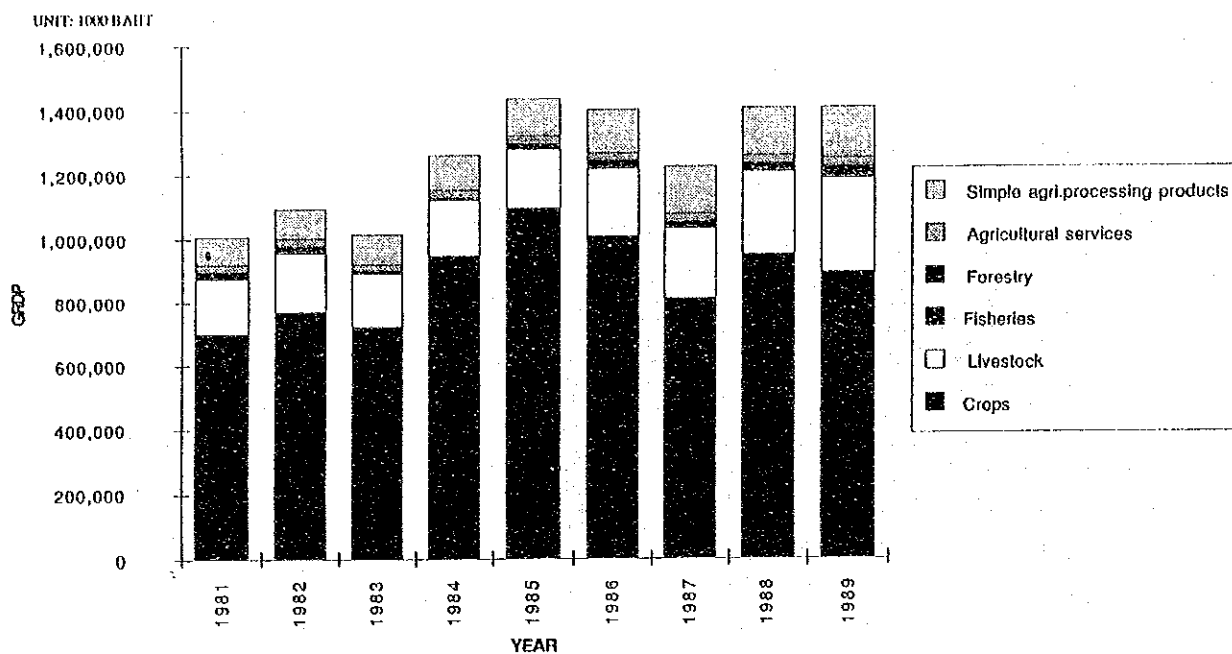
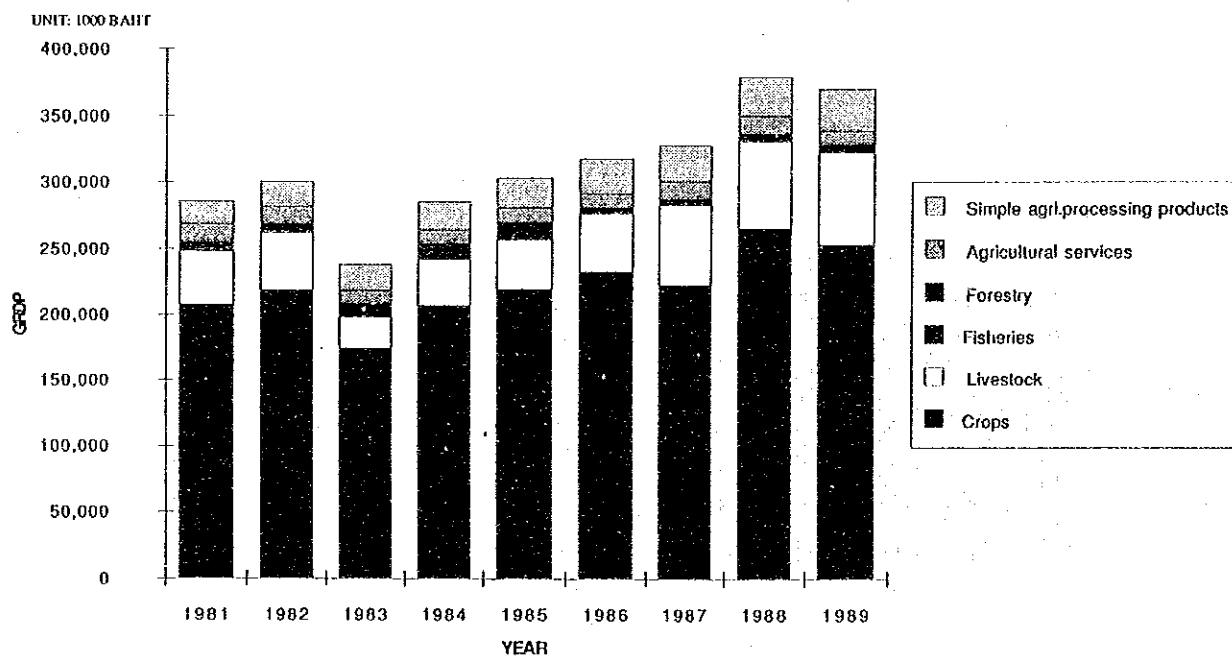


Figure 2.15 Agricultural GRDP at 1972 Constant Prices in Si Sa Ket, 1981-1989



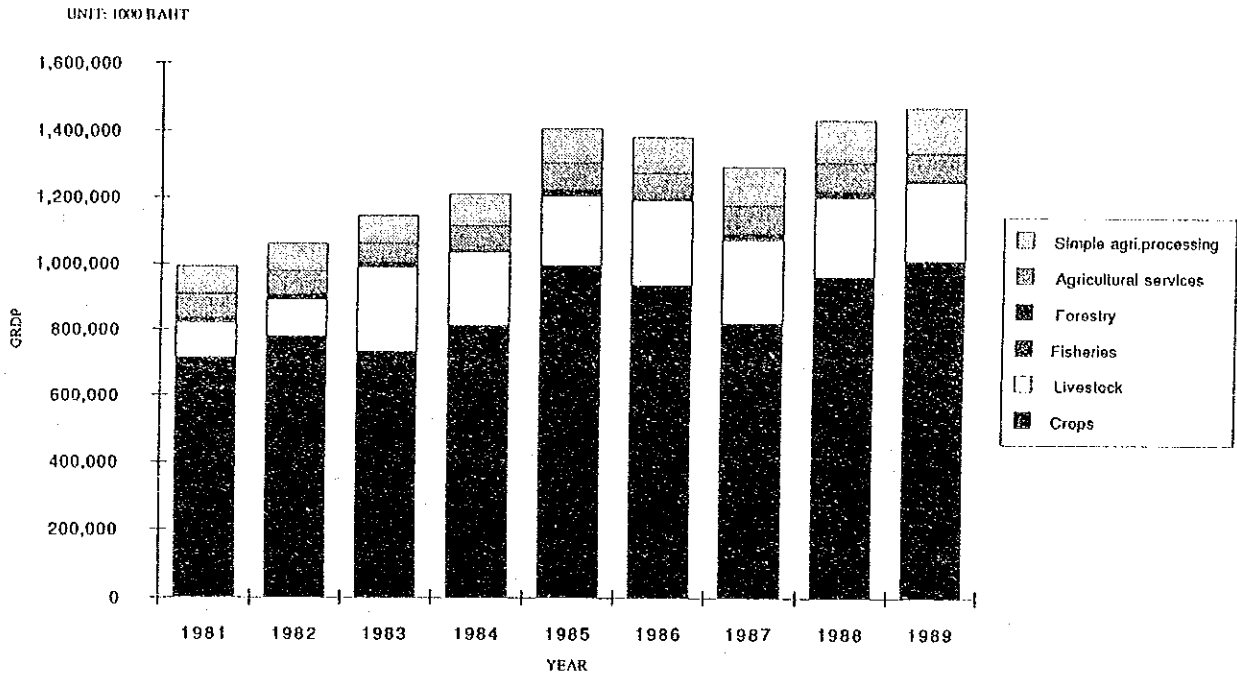
Source: National Economic and Social Development Board, National Account Division

Figure 2.16 Agricultural GRDP at 1972 Constant Prices in Nakhon Nayok, 1981-1989



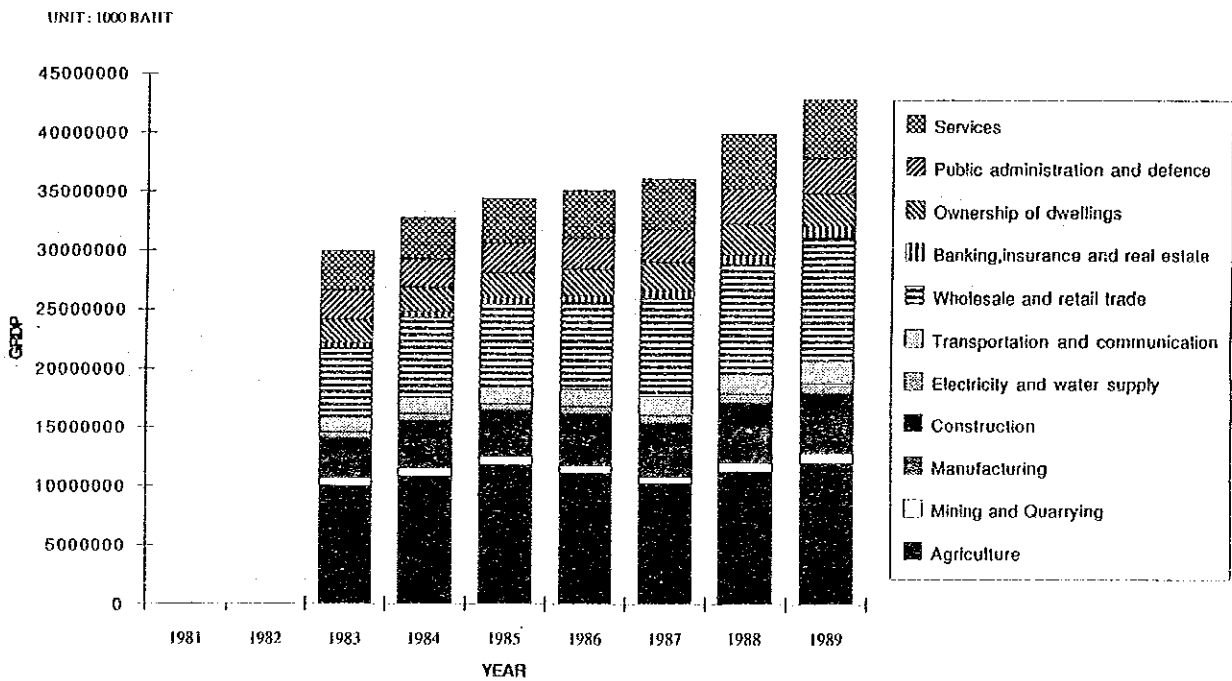
Source: National Economic and Social Development Board, National Account Division

Figure 2.17 Agricultural GRDP at 1972 Constant Prices in Prachin Buri, 1981-1989



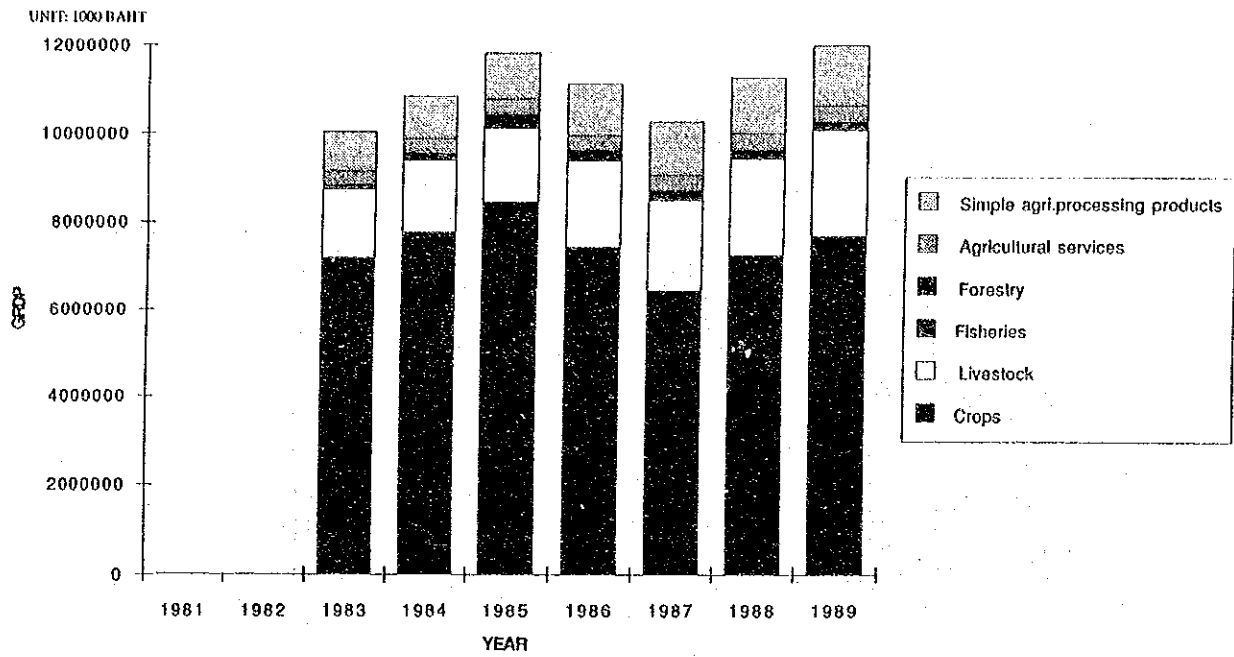
Source: National Economic and Social Development Board, National Account Division

Figure 2.18 GRDP at 1972 Constant Prices in the Study Area, 1983-1989



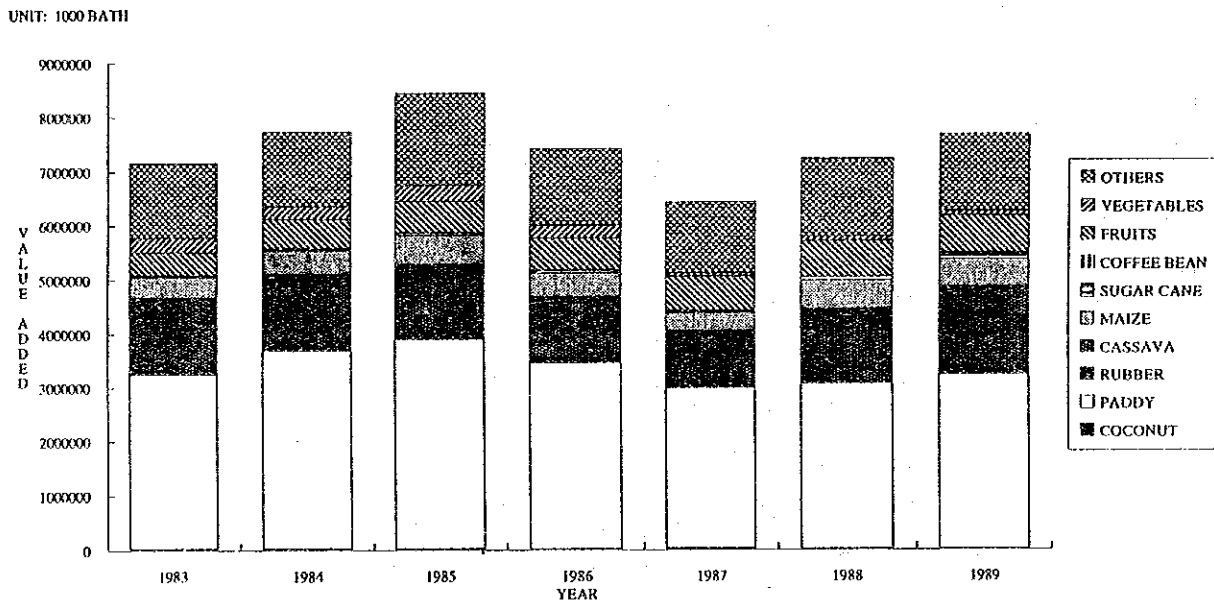
Source: National Economic and Social Development Board, National Account Division

Figure 2.19 Agricultural GRDP at 1972 Constant Prices in the Study Area, 1981-1989



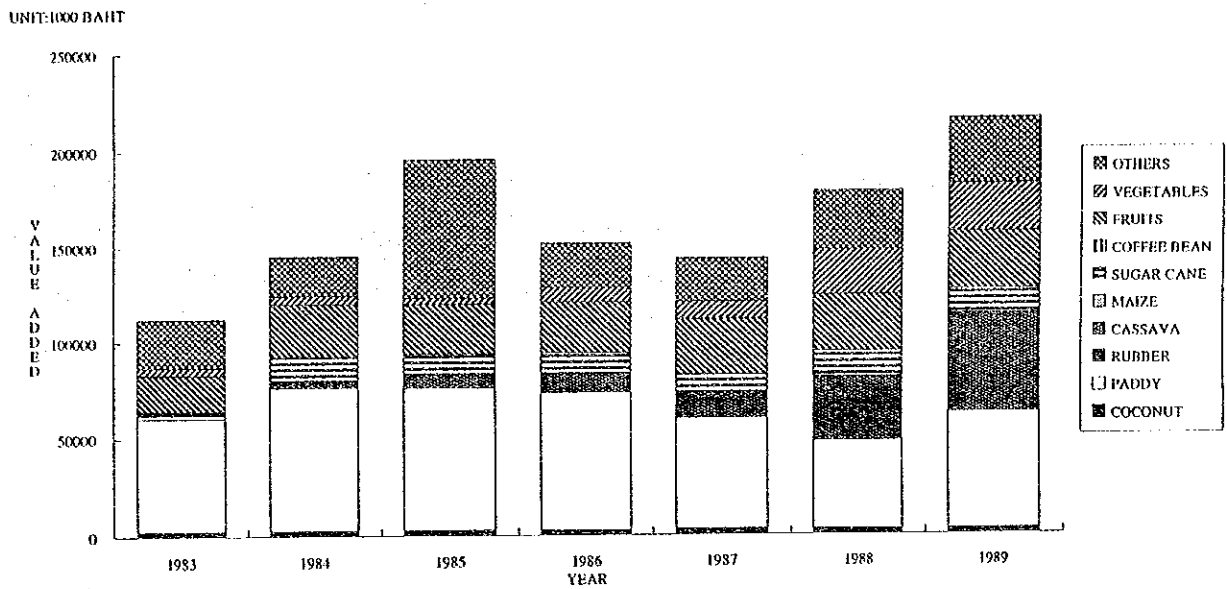
Source: National Economic and Social Development Board, National Account Division

Figure 2.20 Value-Added by Crops in 1972 Constant Prices in the Study Area, 1983-1989, Crop-Wise



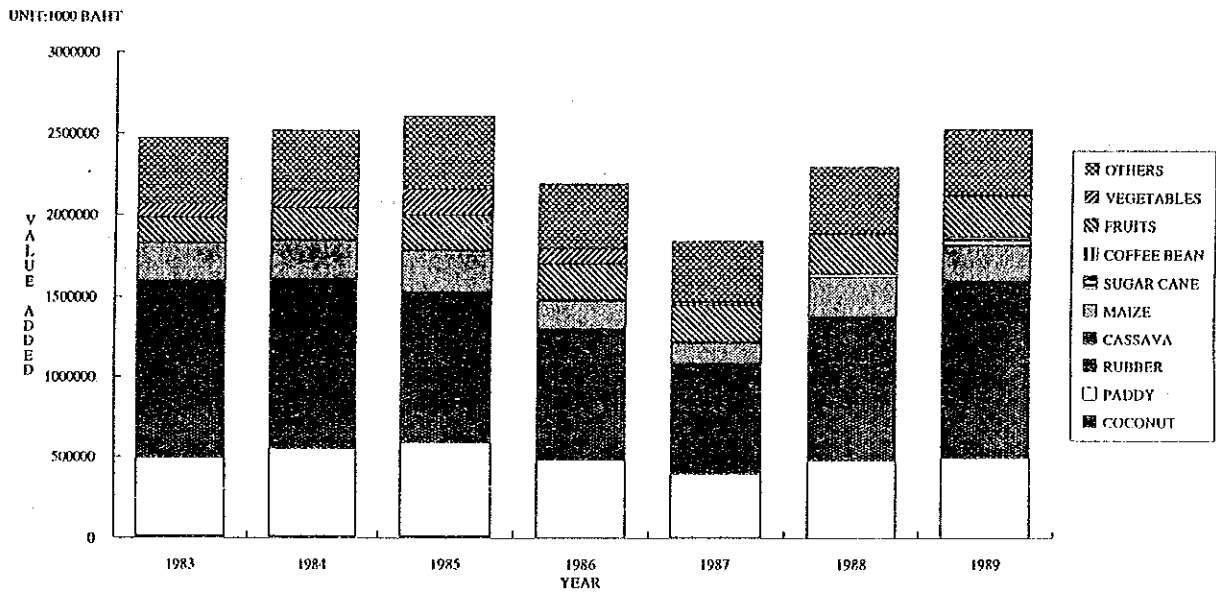
Source: National Economic and Social Development Board, National Account Division

Figure 2.21 Value-Added by Crops in 1972 Constant Prices in Mukdahan, 1983-1989



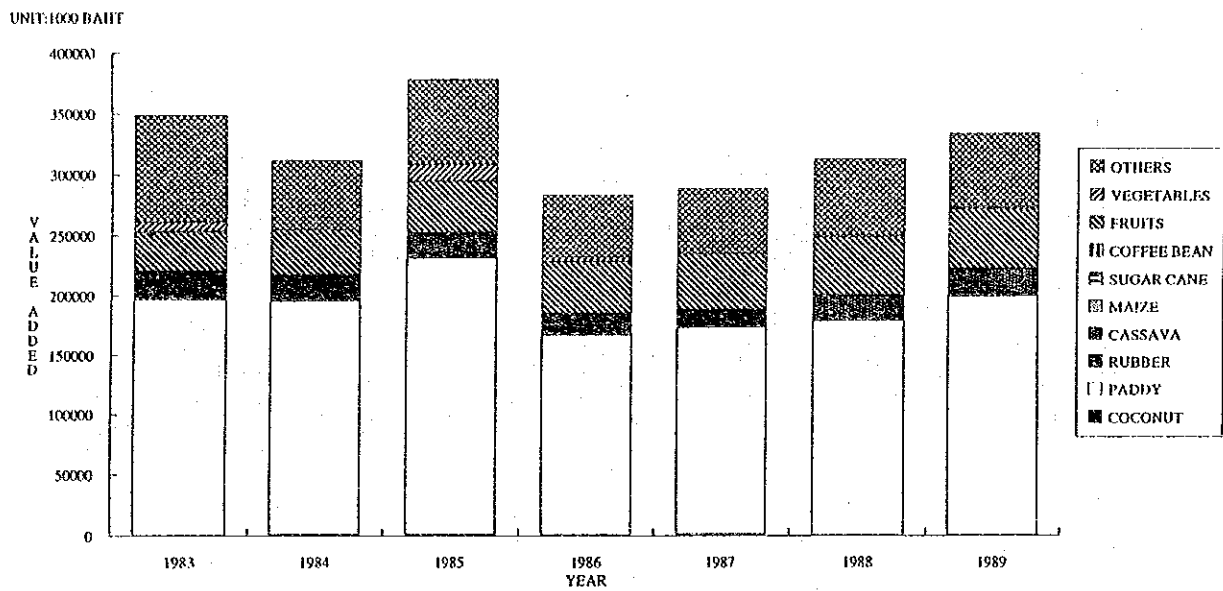
Source: National Economic and Social Development Board, National Account Division

Figure 2.22 Value-Added by Crops in 1972 Constant Prices in Nakhon Ratchasima, 1983-1989



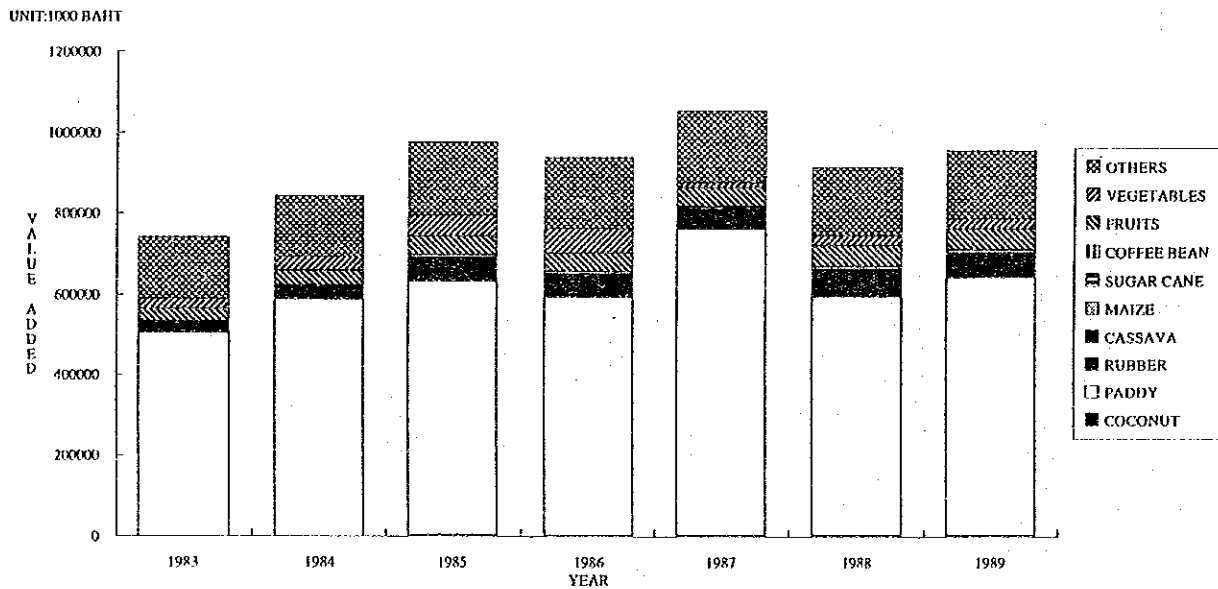
Source: National Economic and Social Development Board, National Account Division

Figure 2.23 Value-Added by Crops in 1972 Constant Prices in Yasothon, 1983-1989



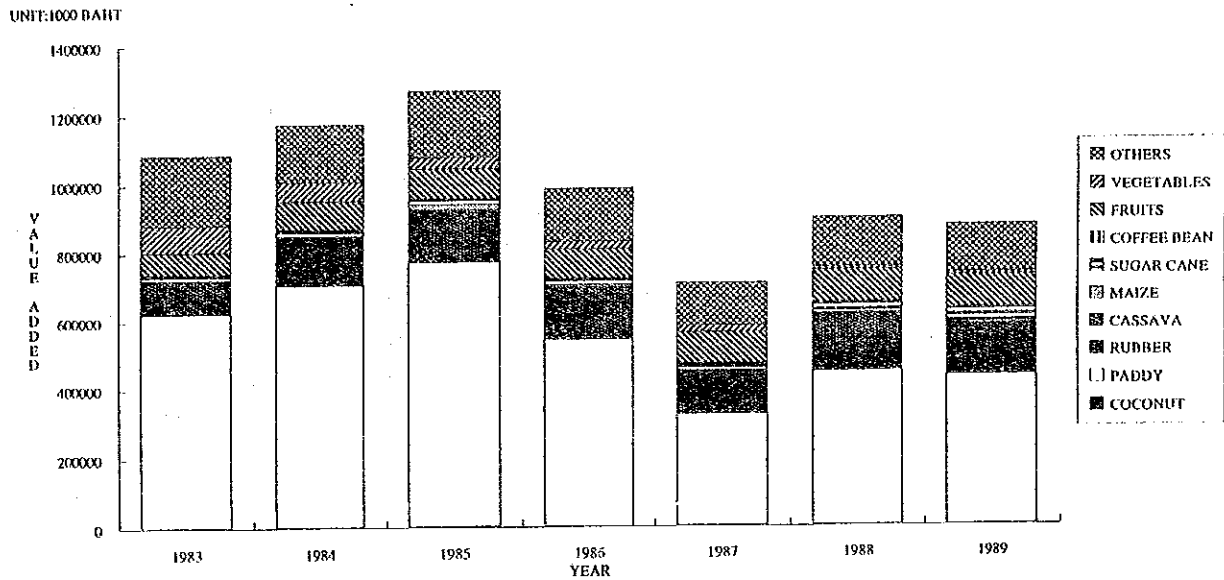
Source: National Economic and Social Development Board, National Account Division

Figure 2.24 Value-Added by Crops in 1972 Constant Prices in Ubon Ratchathani, 1983-1989



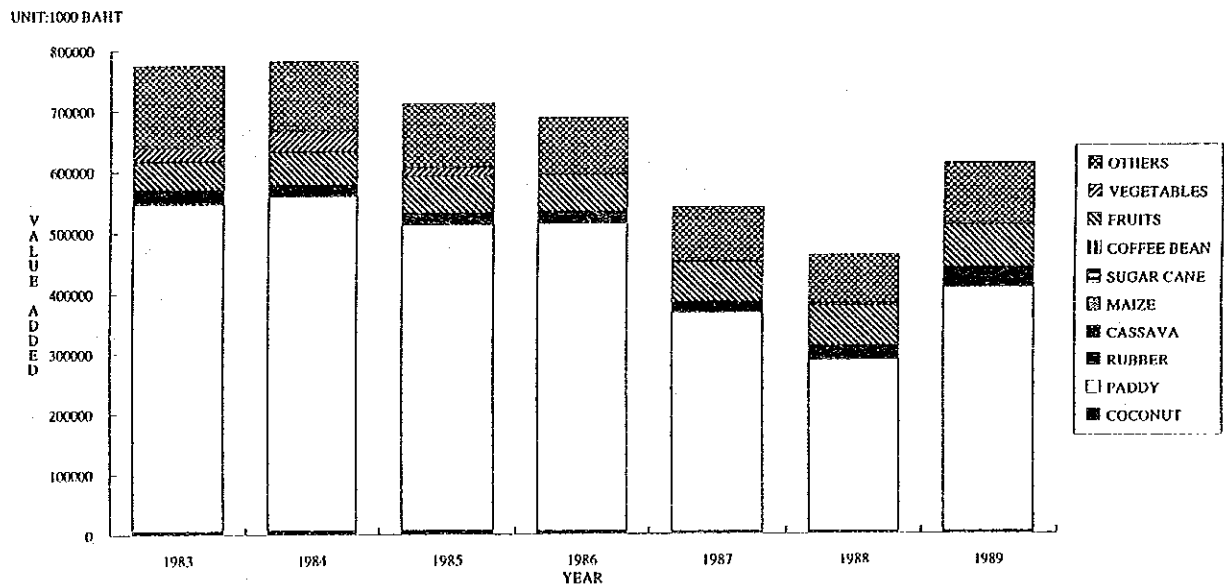
Source: National Economic and Social Development Board, National Account Division

Figure 2.25 Value-Added by Crops in 1972 Constant Prices in Buri Ram, 1983-1989



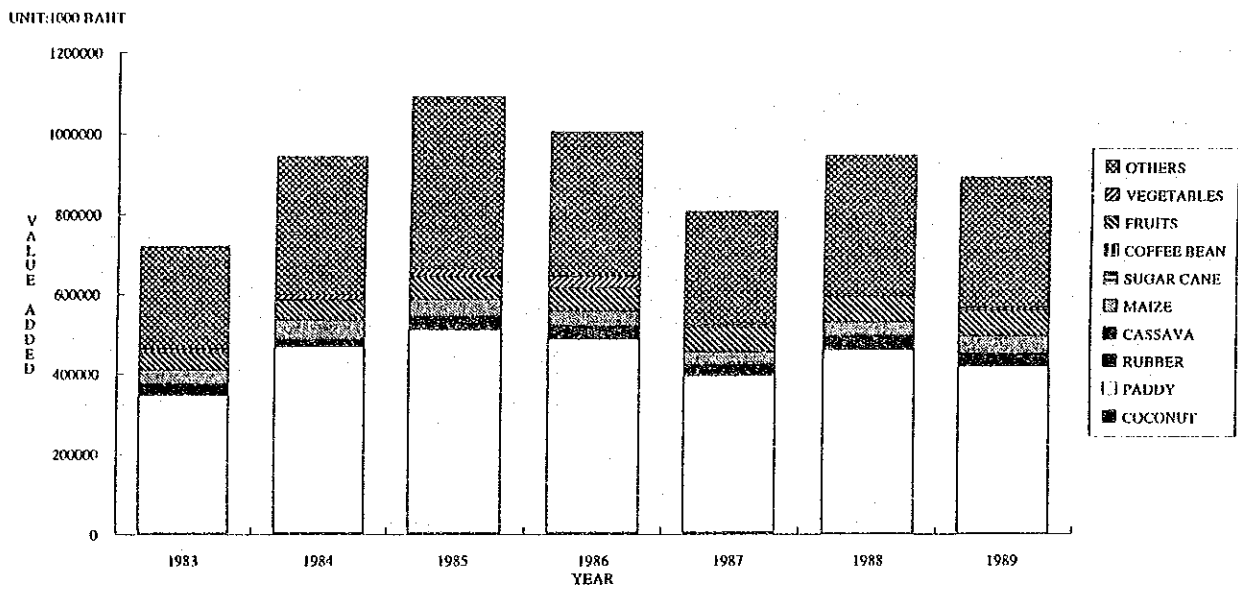
Source: National Economic and Social Development Board, National Account Division

Figure 2.26 Value-Added by Crops in 1972 Constant Prices in Sunin, 1983-1989



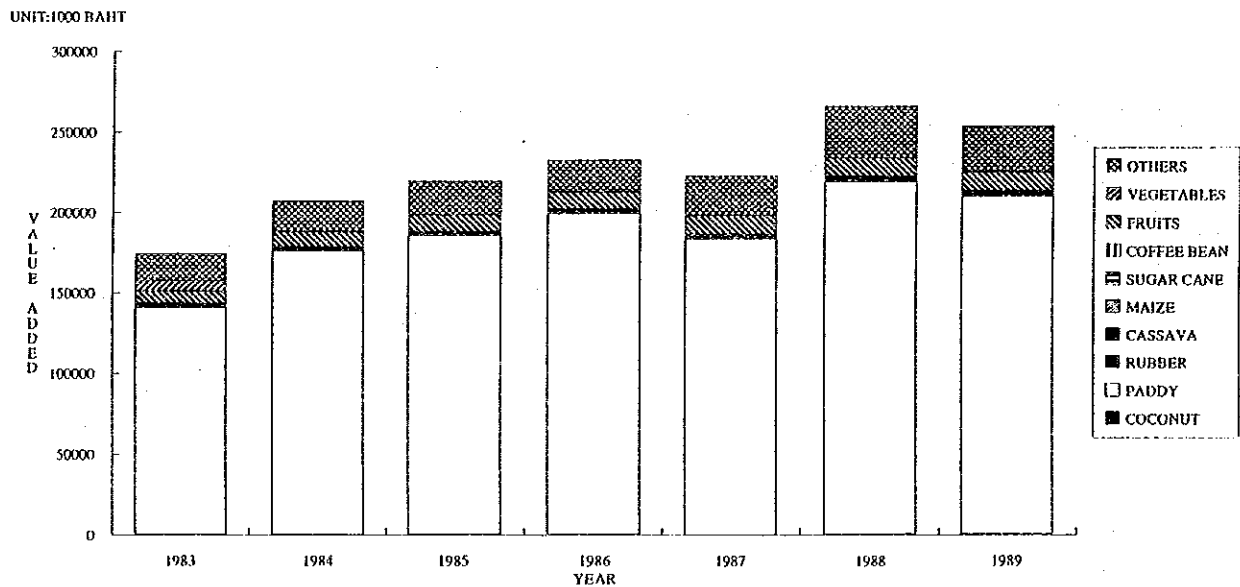
Source: National Economic and Social Development Board, National Account Division

Figure 2.27 Value-Added by Crops in 1972 Constant Prices in Si Sa Ket, 1983-1989



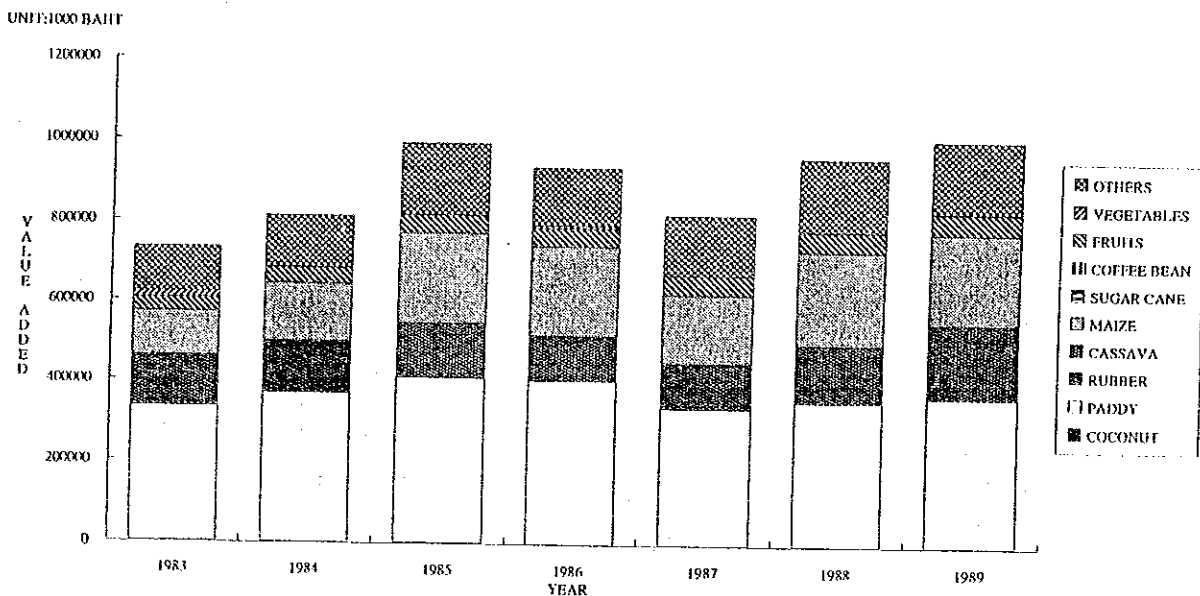
Source: National Economic and Social Development Board, National Account Division

Figure 2.28 Value-Added by Crops in 1972 Constant Prices in Nakhon Nayok, 1983-1989



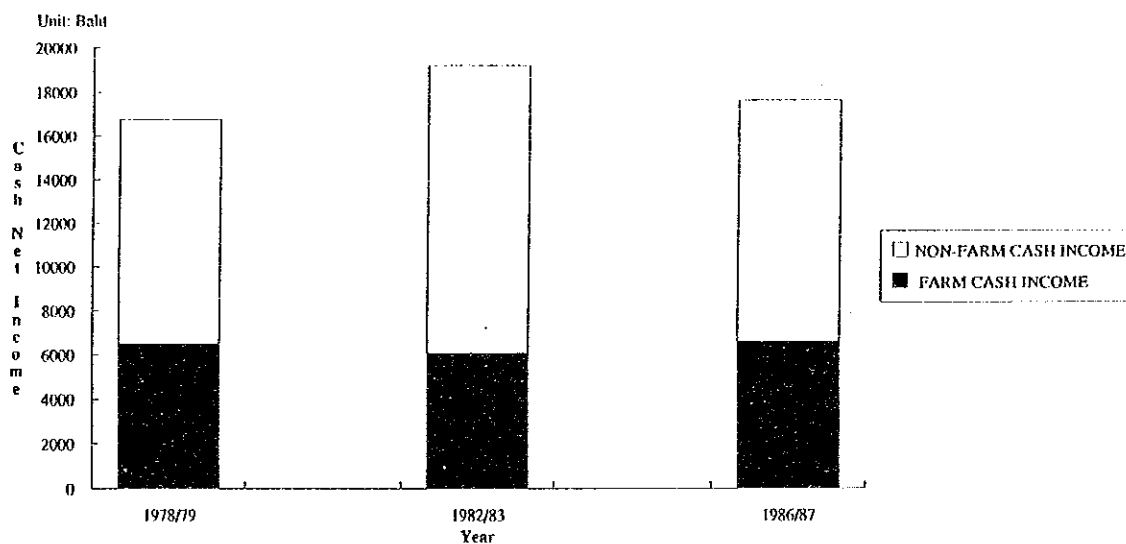
Source: National Economic and Social Development Board, National Account Division

Figure 2.29 Value-Added by Crops in 1972 Constant Prices in Prachin Buri, 1983-1989



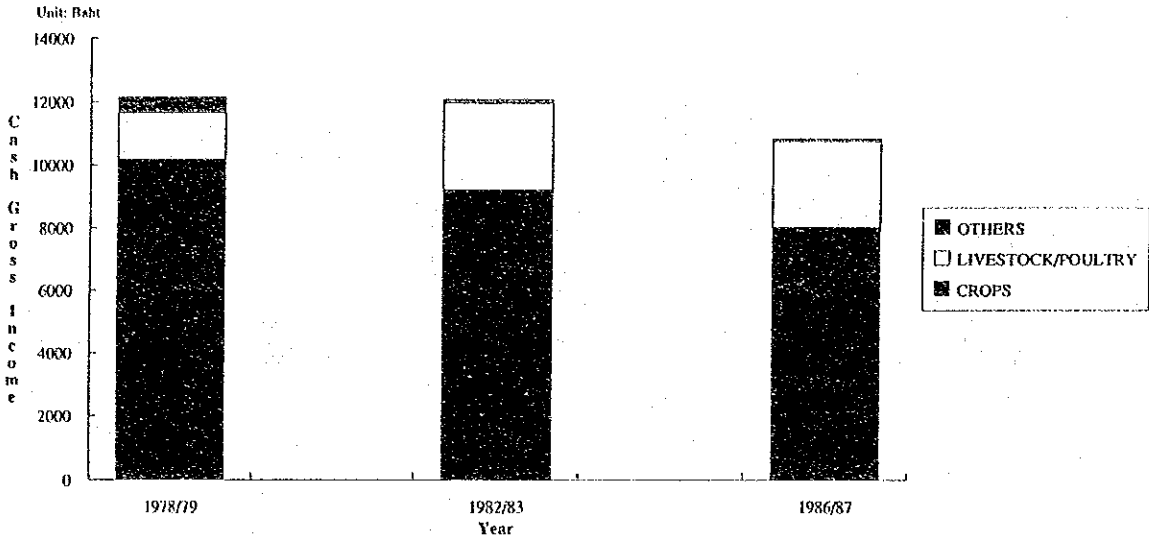
Source: National Economic and Social Development Board, National Account Division

Figure 2.30 Farm Household Cash Income in 1985 Constant Value in the Northeast, 1978/79-1986/87

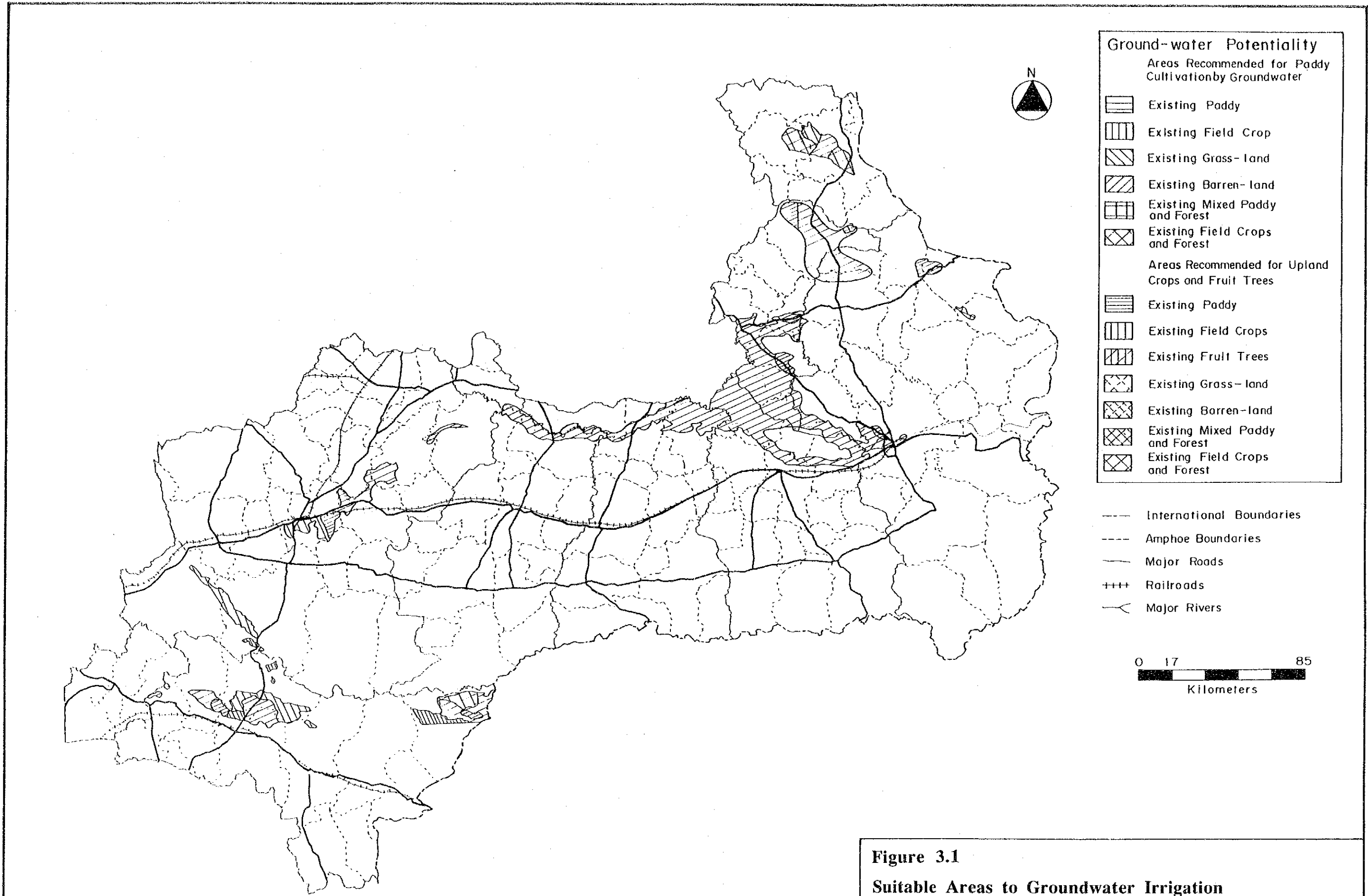


Source: "Agricultural Statistics of Thailand", Center for Agricultural Statistics, Ministry of Agriculture & Cooperatives

Figure 2.31 Household Gross Farm Income in the Northeast in 1985 Constant Prices, 1978/79-1986/87



Source: "Agricultural Statistics of Thailand", Center for Agricultural Statistics, Ministry of Agriculture & Cooperatives



Note : This map composition was prepared using the Geographic Information System (GIS) Database developed in the study.

Figure 3.1
Suitable Areas to Groundwater Irrigation
 The Study on the Regional Development Plan
 for the Lower Northeast and the Upper East Regions
 in the Kingdom of Thailand

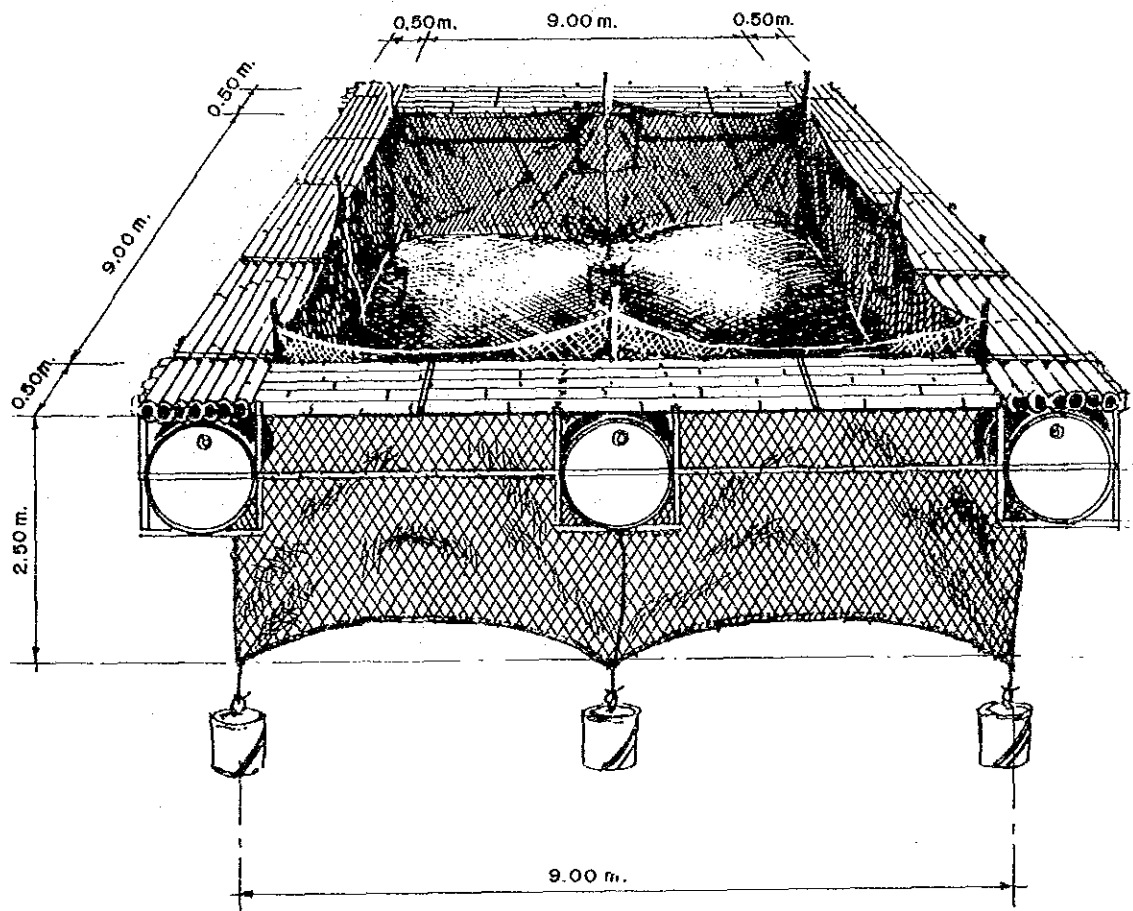


FIG. 3.2

FLOATING NET GAGE

The Study on the Regional Development Plan for the Lower Northeast and the Upper East Regions in the Kingdom of Thailand

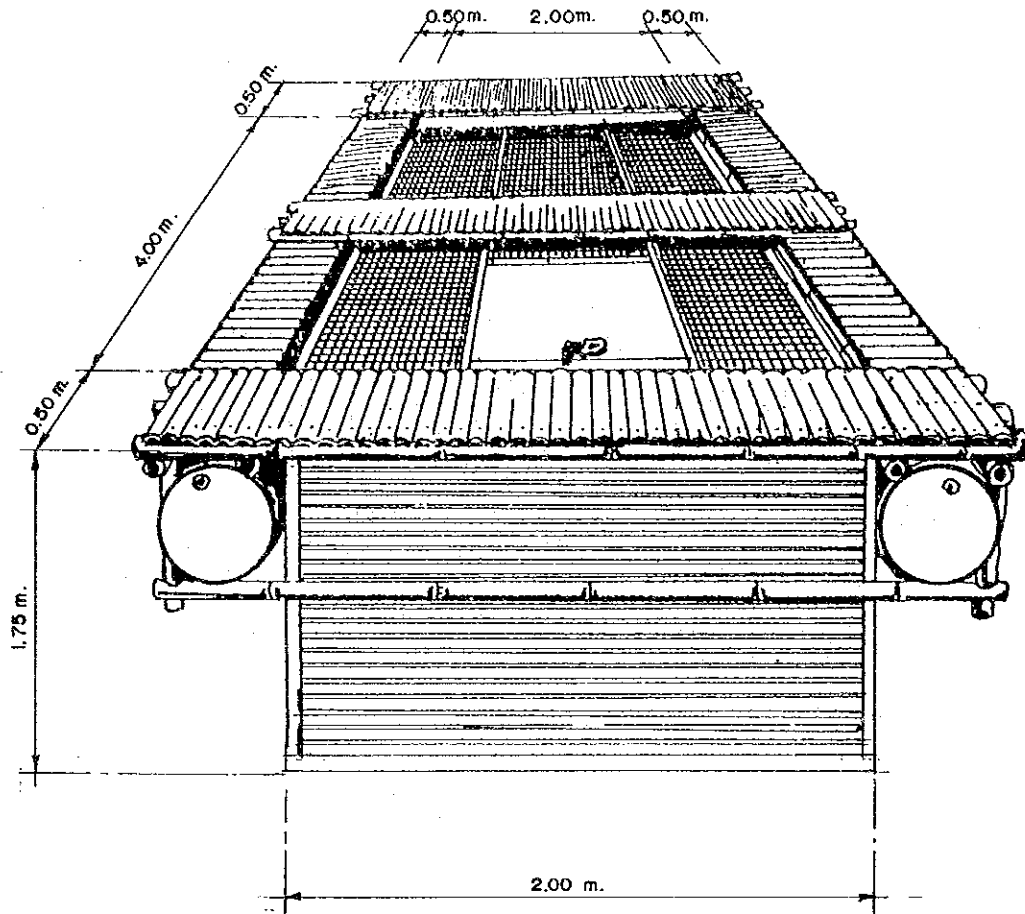


FIG. 3.3

FLOATING GAGE

APPENDIX A

**ON-GOING AGRICULTURAL DEVELOPMENT PROJECTS
IN THE STUDY AREA**

Appendix A On-going Agricultural Development Projects in the Study Area

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
<p>A. MINISTRY OF AGRICULTURE & COOPERATIVE</p> <p>1. Agricultural Research Plan, Office of Permanent Secretary</p> <p>2. The Royal Irrigation Department</p>	<p>Northeast Agricultural Development Research Center project</p> <p>Upper Moon River Project</p>	<ul style="list-style-type: none"> - To increase agricultural products by using low production cost to up-grade standard of living for North-East farmer and rural people - To develop upper Moon river basin - To increase unit yields and solve flood problems by construction of dam reservoir 	<ul style="list-style-type: none"> - Development of agricultural appropriate technologies and distributing them to North-East farmer - Upper Moon dam reservoir Height 32.70 m. Length 880m. Capacity 141 MCM - Lum Sae dam reservoir Height 29.50 m. Length 2.4 km. Capacity 275 MCM. 	<p>163,987,220</p> <p>3,200,000,000</p>
		<ul style="list-style-type: none"> - Drainage system, and paddy field Irrigation system 	<ul style="list-style-type: none"> - Upper Moon dam irrigation system consisting of 2 main canals, length 49.40 km. and 12 sub-canals, length 63.65 km. - Lum Sae dam irrigation system consisting of 2 main canals, length 96.30 km. and 33 sub-canals, length 95.28 km. - Irrigation of agriculture areas in project zone, total 122,000 rais 	<p>6,371,550,000</p>

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
3. The Royal Irrigation Department	Development of Water Resources in foot of Pha Nom Dong Rek Mountain areas	<ul style="list-style-type: none"> - To develop water resources in foot of Pha Nom Dong Rek mountain areas - To irrigate areas - To increase unit yields 	<ul style="list-style-type: none"> - Construction water retention reservoirs accompanied with 55 accessory buildings capacity 695.40 mcm. - Construction of dikes in Moon river and tributaries 30 places and irrigation of about 378,480 rai 	637,150,000
4. The Royal Irrigation Department	Irrigation development Project	<ul style="list-style-type: none"> - To create stability in farmers' incomes in Northeast region irrigated areas of 634,425 rai, by developing existing irrigation systems to distribute water through to farmers, and providing suitable crops cultivation 	<ul style="list-style-type: none"> - Improvement of drainage canals both main and sub-canals, 305.50 km. - Construction and improvement of ditches, 554,425 rai - Consturction and improvement of offices and houses, 66 units - Constructing 12 training center - Experiment in contracting project maintenance for 3 projects 	1,175,250,000

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
5. The Royal Irrigation Department	Khao E-Thoe 2 Reservoir Project (Prachin Buri)	- To irrigate agricultural areas by construction of irrigation systems	- A earth dam Height 6.5 m. Length 450 m. Capacity 2.0 MCM.	35,000,000
6. The Royal Irrigation Department	Huai Sa-Baek Project (Yasothon)	- To irrigate agricultural areas by construction of irrigation systems	- Reservoir Height 19.00 m. Length 1,932.00 m. Capacity 26.80 MCM. - 9 concrete irrigation canals total length 14.62 km. - Irrigation of 12,000 rai agricul- tural areas	191,221,780
7. The Royal Irrigation Department	Huai Ling-Jone Project (Yasothon)	- To irrigate agricultural areas by construction of irrigation systems	- Reservoir Height 15.00 m. Length 2,050 m. Capacity 12.0 MCM. - 5 concrete irrigation canals, total length 25.0 km. - irrigation of agricultural areas of 6,400 rai	179,983,800

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
8. The Royal Irrigation Department	Lower Huai Phaya Sua Project (Ubon Ratchathani)	- Irrigation	<ul style="list-style-type: none"> - Reservoir Height 11.0 m. Length 2280.0 m. Capacity 34.0 MCM. - 8 concrete irrigation canals total length 28.77 km. - Irrigation of 25,000 rai agricul tural areas 	135,654,600
9. The Royal Irrigation Department	Lam Pha Tia Drainage System Project (Buri Ram)	- Construction of irrigation system	<ul style="list-style-type: none"> - Concrete irrigation canals, total length 62.0 km. - Irrigation of agricultural area of 18,000 rai 	133,069,300
10. The Royal Irrigation Department	Huai tha Chu Project (Si Sa Ket)	- To irrigate agricultural areas, by construction of irrigation systems	<ul style="list-style-type: none"> - Reservoir Height 31.0 m. Length 1,450 m. Capacity 12.0 MCM. - Irrigation of 13,000 rai of agricultural areas 	138,301,900

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
11. The Royal Irrigation Department	Lam Phang Chu Project (Buri Ram)	- To irrigate agricultural areas by constructing irrigation systems	<ul style="list-style-type: none"> - An irrigation weir Width 6.0 m. Height 6.5 m. 3 gates - 5 concrete canals total length 27.5 km. - Irrigation of 10,000 rai agricul- tural areas 	91,020,100
12. The Royal Irrigation Department	Huai Phrasat Yai Project (Nakhon Ratchasima)	- To irrigate agricultural areas	<ul style="list-style-type: none"> - 1 reservoir Height 17.0 m. Length 1,050.0 m. Capacity 9.0 MCM. - concrete irrigation canals, total length 28.4 km. - Irrigation of agricultural areas of 3,800 rai 	69,063,000

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
13. The Royal Irrigation Department	Huai Si Tho (Ubon Ratchathani)	- To irrigate agricultural areas by construction of irrigation system	<ul style="list-style-type: none"> - 1 reservoir Height 16.0 m. Length 455.0 m. Capacity 8.0 MCM. - Concrete irrigation canals total length 12.0 km - Irrigation of 3,900 rai agricultural areas 	80,000,000
14. The Royal Irrigation Department	Huai Yang Pha Lai (Nakhon Ratchasima)	- To irrigate agricultural areas by construction of irrigation system	<ul style="list-style-type: none"> - 1 reservoir Height 13.0 m. Length 1220 m. Capacity 11.0 MCM. - Concrete irrigation canals length 12.3 km. - Irrigation of 4,500 rai agricultural areas 	110,000,000
15. The Royal Irrigation Department	Small Scales Irrigation Projects (Whole Kingdom)	- To alleviate water shortage, flood and seawater intrusion by construction of small scale irrigation facilities to be finished within 1 year	<ul style="list-style-type: none"> - Phase 4 (1992 - 1996) various types of small scale irrigation projects in whole kingdom, 2,000 projects 	29,432,861,200

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
16. Livestock Department	Livestock Extension Project, according to His Majesty the King Recommendation	<ul style="list-style-type: none"> - Promotion of livestock raising for increasing incomes of farmers 	<ul style="list-style-type: none"> - Extension and demonstration of livestock raising - Improvement of livestock breeding and foliage crops for animal nutrition - Training of livestock farmers 	178,962,200
17. Livestock Department	Development of Livestocks in Tung Kula Rong Hai areas, Phase 3	<ul style="list-style-type: none"> - Promotion of livestock raising for farmers in Tun Kula Rong Hai areas by developing pasture areas and improving breeds of cattle and buffaloes 	<ul style="list-style-type: none"> - Improvement of public pastures in villages and growing grasses behind the villagers houses, total area 30,000 rai - Reserving animal nutrition by dry and fresh grass of 50,000 kg. - Improving livestock breeding, 40,000 heads - Protection and suppression of animal diseases, for 65,000 heads - Distribution of incomes for farmers by purchasing the seeds of crops used for animal nutrition from farmers, 125,000 kg. 	72,722,100

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
18. Livestock Department	Land consolidation for poor people in deteriorated forest areas in Northeast (17 provinces)	<ul style="list-style-type: none"> - Promotion and development of animal raising for farmers to become economically independent 	<ul style="list-style-type: none"> - Promotion and development of farmers' job opportunities by cattles and buffalos raising including poultries in 250,000 families 	470,360,100
19. Royal Forestry Department	Establishment of Northeast region Center for Forest Tree Nursery Seedling (Northeast 17 provinces)	<ul style="list-style-type: none"> - Increasing in efficiency and capacity of forest trees seedling production 	<ul style="list-style-type: none"> - Establishment of 4 centers for tree seedling production - Demonstrating 46,000 rai of reforestation - Establishment of 4 centers for reforestation and forestry training 	914,196,000
20. Royal Forestry Department	Research and Training of Reforestation Pak Thongchai District, Korat	<ul style="list-style-type: none"> - For study, researchs and experiment to seek patterns and methods of efficient and suitable for large scale reforestation, in order to develop and rehabilitate conservation forests that have been destroyed - For being center of training and distributing reforestation for public and private agencies 	<ul style="list-style-type: none"> - 100 million prevention of trees seedlings - Establishment of 1 research and training center - Holding training 10 times/year - Study and research of 20 issues of reforestation - Demonstrative growing 15,800 rai of reforestation 	252,005,200

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
21. Royal Forestry Department	Land Consolidation for Poor People in Northeast Deteriorated Forests (Northeast 17 provinces)	<ul style="list-style-type: none"> - For poor Northeast people to get legitimate earning and having residences and to up-grading quality of live - For conservation and rehabilitation of natural resources under suitable land use 	<ul style="list-style-type: none"> - Providing farm land and residences for 250,000 families - Surveying and land titling for 4,875,000 rai of farmland - Community management for 250,000 families - Reforestation for 625,000 rai - Production of 325 million samplings of woods and fruit trees 	3,824,300,100
22. Land Development Department	Development of Salty Soil Areas (17 provinces)	<ul style="list-style-type: none"> - For rising research and study concerning useful use of salty soil areas, and protection of salty soil development 	<ul style="list-style-type: none"> - 100 researching works - Training 1,500 officials for salty soil improvement - Training 500 farmer leaders for salty soil improvement - Advising and improvement of soil for 30,000 farmers 	310,688,200

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
23. Land Development Department	Land Development in Tung Kula Rong Hai Areas, Phase 3	<ul style="list-style-type: none"> - For Tung Kula Rong Hai areas to become arable producing crops for farmers 	<ul style="list-style-type: none"> - Pilot project for increasing paddy production in moderately salty soil areas, 6,000 rai - Providing seeds for salty soil improvement 250 tons - Establishment of salty soil maps, 1:50,000 scale, for 54 provinces - Forestation to prevent of salty soil diffusion, 10,000 rai - 50 projects for experiment and researchs - Demonstrating land development for 5,000 rai - Extension of land development technologies to 150,000 farmers - Training 2,500 farmer leaders - Survey, design and construction of soil and water conservation 	1,288,934,000

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
24. Land Development Department	Land Development Owing to His Majesty the King Recommen- dations	<ul style="list-style-type: none"> - To develop areas in comprehensive manner to up-grade incomes of farmers in project areas 	<p>systems for land leveling of land, 500,000 rai</p> <ul style="list-style-type: none"> - Digging 500 shallow wells - Demonstrating and promoting of suitable land use for expansion of crops production in 1,000 places/ 25,000 rai - For up-grading standard of living of farmers in project areas - For sufficient increasing products for consumption and sufficient incomes of farmers to earn living 	341,831,000
25. Land Development Department	Northeast Agricultural Development Research Project	<ul style="list-style-type: none"> - To collect information on agricultural products to increase crop production in Northeast region 	<ul style="list-style-type: none"> - Evaluation of natural resources for planning appropriate land use in 18 projects - Research and development of technologies suitable to local conditions, 115 projects 	32,142,200

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
26. Land Development Department	Land development for useful use of small scale water resources in the fields	<ul style="list-style-type: none"> - To increasing useful use of existing water resrouces 	<ul style="list-style-type: none"> - Training 10,000 government officials - Training 15,000 farmer leaders - Advised knowledge to 125,000 common farmers - Demonstration of proper water and land use for 20,000 rai - Improvement of areas in land use and water use system, 250,000 rai 	1,014,904,700
27. Land Development Department	Land development of high land community areas	<ul style="list-style-type: none"> - To collect data and information concerning suitability of high land areas land use planning 	<ul style="list-style-type: none"> - Preparation of preliminary land suitability maps for 15.5 million rai (scale 1:250,000) - Demonstration of suitable soil and water conservation system in high land areas, 44,000 rai - Planning of proper land use for 1.5 million rai with maps (scale 1:50,000) 	107,322,600

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
28. Land Development Department	Small scale water resources development	<ul style="list-style-type: none"> - For the farmers in rainfed areas to get more water 	<ul style="list-style-type: none"> - Small scale water resources development in rainfed villages 	23,108,200,000
29. Land Development Department	Land development project for poor people on deteriorated forest areas in Northeast region	<ul style="list-style-type: none"> - To improve land use, and diminish exploitive land use - To give knowledge on protection of soil to farmers, including knowledge on suitable land use 	<ul style="list-style-type: none"> - Particularly separated surveys and planning of land use 128/197,000 villages/rai - Designing of villages on soil and water conservation systems for 80,000 rai 	43,438,620
30. Department of Agriculture	Northeast Agricultural Development Research Center Proejct (16 Provinces)	<ul style="list-style-type: none"> - To develop crops, suitable to Northeast region - To develop suitable technologies for soil and water management, improvement of soil fertility and fertilizer use 	<ul style="list-style-type: none"> - Construction of soil and water conservation system, 980 km. - Training of 14,080 farmers - Increase agricultural products in 16 provinces in Northeast region 	25,374,300

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
31. Department of Agriculture	Agricultural extension services for Tung Kula Rong Hai areas Phase 3	<ul style="list-style-type: none"> - To up-grade farmer incomes in project areas to the average incomes of Northeast region by extension of agricultural knowledge for the farmers 	<ul style="list-style-type: none"> - For study, and research works on the way to increase crops production such as rice, field crops, trees crops and others in Tung Kula Rong Hai area 	53,798,900
32. Department of Agriculture	Export improvement in fruits, vegetables, flowers and decorated trees	<ul style="list-style-type: none"> - To obtain academic data and information on production, export and up-grade quality of fruits, vegetables, flowers and decorated tree 	<ul style="list-style-type: none"> - Research on pre - and post-improvement to international market suitable demands 	38,583,300
33. Department of Agriculture	Preparation of guidance use of insecticide	<ul style="list-style-type: none"> - To offer farmers efficiently use of chemical, decreasing abused chemical use - Construction of research center including laboratory workshop for efficient checking, analysing and advising agricultural chemical use for farmers in the kingdom 	<ul style="list-style-type: none"> - Analysing and diagnosing chemical quality of 5,000 local chemical examples - Analysing and diagnosing 20,000 example plants - Publishing advisory chemical use hand book, 75,000 copies - Establishment of 4 places of plant clinic 	41,274,000

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
34. Department of Agriculture	Rice development in un-developed agricultural areas	<ul style="list-style-type: none"> - To develop technologies of rainfed rice production for increasing rice production 	<ul style="list-style-type: none"> - Extension of quality rice to village paddy warehouses, total 6,020 paddy warehouses - Monitoring and evaluation of project when project finished, total 5,520 villages - Establishment of demonstration plots of upland paddy in un-developed semi-developed agricultural areas, 250 villages, 250 rai 	88,714,000
35. Department of Agriculture	Accelerated growing of fruit trees, tree crops for distribution of incomes in North and Northeast regions	<ul style="list-style-type: none"> - To accelerated distribution of incomes, by distribution of quality seedlings of tree crops which have good marking prospects to farmers in North and Northeast region 	<ul style="list-style-type: none"> - Production of quality seedlings of tree crops, total 2,934,200 sapling 	42,503,400
36. Department of Agriculture	Land settlement for poor people in deteriorated forest areas in Northeast region	<ul style="list-style-type: none"> - Development agro-forestry suitable to specific areas in Northeast 	<ul style="list-style-type: none"> - Experiment of agro-forestry in deteriorated forest areas total 352 deteriorated forests of 17 provinces in Northeast 	20,040,000

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
37. Department of Agriculture Extension	Farmer production supporting project	<ul style="list-style-type: none"> - To support farmers to have production plan according to their proficiencies and demands, to conform with area potentials, farmer resources, market demands 	<ul style="list-style-type: none"> - Assistance of farmers in 62,373 villages in project areas to have production plan according to their proficiencies and demands, to conform with area potentials, farmer resources and market demands 	82,337,200
38. Department of Agriculture Extension	Agricultural promotion in Tung Kula Rong Hai area, Phase 3	<ul style="list-style-type: none"> - To up-grade farmer incomes in project areas to equal to the average income of Northeast region farmers, by transferring technologies including suitable varieties 	<ul style="list-style-type: none"> - Increasing rice unit yield in no less than 20 kg./rai/year - Development of farm land to not less than 20% of project area - Crop diversification to not less than 5 kinds - Creating mixed farming in every Tamboon, at least 1 farm in each Tambon 	47,681,200
39. Department of Agriculture Extension	Agricultural promotion owing to His Majesty the King Recommendation	<ul style="list-style-type: none"> - To improve social and economic conditions of villagers living in project area, by transferring technologies including suitable varieties 	<ul style="list-style-type: none"> - Municipalities 	238,381,600

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
40. Department of Agriculture Extension	Agricultural Business Promotion	<ul style="list-style-type: none"> - To support farmers, farmer organizations and officials by giving knowledge and skills of agricultural business administration and agro-industries - To select poverty zones to up-grade 	<ul style="list-style-type: none"> - Formulating agricultural promotion zones in Tambon, Amphoe, Province and region levels - Promotion of public and private agencies participation in industrial development and agricultural business administration workshop to offer them knowledge and skills in the field of business administration and agro-industries 	283,661,700
41. The Cooperative Promotion Department (Amphoe Wattana Nakhon, Prachin Buri)	Cooperative promotion project, owing to His Majesty the King Recommendation	<ul style="list-style-type: none"> - To improve villager quality of life in the project areas, by using the principle and means of cooperative 	<ul style="list-style-type: none"> - Study of 73 industry development plans in the region - Establishment of 9 agricultural business promotion centers in regional level - Advising in business operation of cooperative 	20,244,551

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
42. The Cooperative Promotion Department	Cooperative promotion in Tung Kula Rong Hai areas, Phase 3	<ul style="list-style-type: none"> - To solve problems and develop farmer quality of lives in Tung Kula Rong Hai areas by using cooperative principle and means 	<ul style="list-style-type: none"> - Increasing farmer incomes in Tung Kula Rong Hai areas to the average level of Northeast region 	30,220,700
43. The Cooperative Promotion Department	Promotion of comprehensive dairy cooperatives in Northeast Region	<ul style="list-style-type: none"> - To promote dairy cooperatives movements covering production, collection, processing and marketing - To increase incomes of cooperative farmers - To substitute imported dairy products according to the government substitution policy - To make pilot modes for other dairy cooperatives of whole kingdom 	<ul style="list-style-type: none"> - Assistance of 5 cooperative in Northeast Region 	11,358,300
44. The Cooperative Promotion Department	Land consolidation for poor people in deteriorated forest areas in Northeast region	<ul style="list-style-type: none"> - To develop cooperatives as instruments for solving the occupational problems - To up-grade standard of living of villages in deteriorated forest areas in Northeast 	<ul style="list-style-type: none"> - Establishment of 40 cooperatives within 4 years (10 cooperative/year) - To support the villagers to establish cooperatives to be finished 40 cooperatives within 4 years (10 cooperative/year) 	139,457,400

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
45. The Agricultural Land Reform Office	Land reform in Tung Kula Rong Hai areas, Phase 3	<ul style="list-style-type: none"> - To up-grade incomes and to increase production of villagers - To set up stability land occupying of farmers in the land reform areas 	<ul style="list-style-type: none"> - Land settlement of 3,000 farms in 75,000 rai 	48,905,000
46. The Agricultural Land Reform Office	Ubon Ratchathani Land Reform Project	<ul style="list-style-type: none"> - To improve, economic and social base of farmers in objective areas - To increase government administration efficiency - To make models of rural development for other areas in Northeast region - To promote self-help of communities 	<ul style="list-style-type: none"> - Development of agricultural base for self-help community organizations 8,500 for farmers in 400,000 rai - Supporting in development of surface and underground water resources in project areas including construction and improvement of roads for 169.002 km. 	197,831,000

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
<p>B. MINISTRY OF INTERIOR</p> <p>1. The Department of Local Administration</p>	<p>Providing clean water in rural for whole kingdom</p>	<ul style="list-style-type: none"> - To sufficiently provide clean water for drinking and domestic use, for rural people by construction or improvement of water resources facilities suitable to local conditions 	<ul style="list-style-type: none"> - Improvement of 20,000 shallow wells - Rehabilitation of 800 water reservoirs such as ponds, swamps, marshes 	<p>199,043,500</p>
<p>2. The Department of Local Administration</p>	<p>Communal irrigation development</p>	<ul style="list-style-type: none"> - To promote and support agricultural occupation by development of small scale water resources including rehabilitation of water retention structures - To solve water shortage for agricultural 	<ul style="list-style-type: none"> - Providing of 20,000 water tanks - Drilling of 12,000 small wells - Construction of 250 small water reservoirs - Rehabilitation of 8,000 small irrigation weirs - Construction of 8,000 small community irrigation weirs 	<p>2,051,636,700</p>
<p>3. The Department of Local Administration</p>	<p>Maintenance and Repairing of small water resources</p>	<ul style="list-style-type: none"> - To promote participation of local public administrations and villagers in maintenance small reservoirism, in order to reduce government budget for these under the policy of 	<ul style="list-style-type: none"> - Maintenance and repairing of 688 small reservoirs 	<p>22,000,000</p>

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
4. The Department of Local Administration	Controlling of land tenant in agricultural for farmers and poor people	<p>"Three co-ordination" that means, Government responsible for 60% Local admin. organization 20% Villagers 20% of budget</p> <ul style="list-style-type: none"> - To solve the land tenant problems, accordance with "Land Tenant for Agricultural Act. 1981" - To assist farmers and poor people in land, property, debts and law cases according to govern- ment policy 	<ul style="list-style-type: none"> - Holding the meeting for Com- mittee of Land Tenant for Agri- cultural (province and tambon levels) - Holding meeting for Sub-commit tee for contribution of farmers and poor people (province and amphoe levles) 	2,993,000
5. Public Works Department	Land settlement of poor people in deterio- rated forest areas in Northeast region	<ul style="list-style-type: none"> - To provide land for poor people in deteriorated preservation forests in Northeast 	<ul style="list-style-type: none"> - Survey, design, and construction of roads, lenght 1,103.125 km. - Drilling of 1,000 underground water wells 	5 years operation (1991 - 1995) 808,439,000
6. The Office of Accelerated Rural Development	Providing land settle- ment for poor people in deteriorated forest areas in Northeast	<ul style="list-style-type: none"> - To provide land for poor people in deteriorated preservation forest areas in Northeast 	<ul style="list-style-type: none"> - Development of infrastructure and providing of land for villagers in deteriorated preservation forest areas in Northeast 	3 year operation (1991 - 1993) 885,169,660

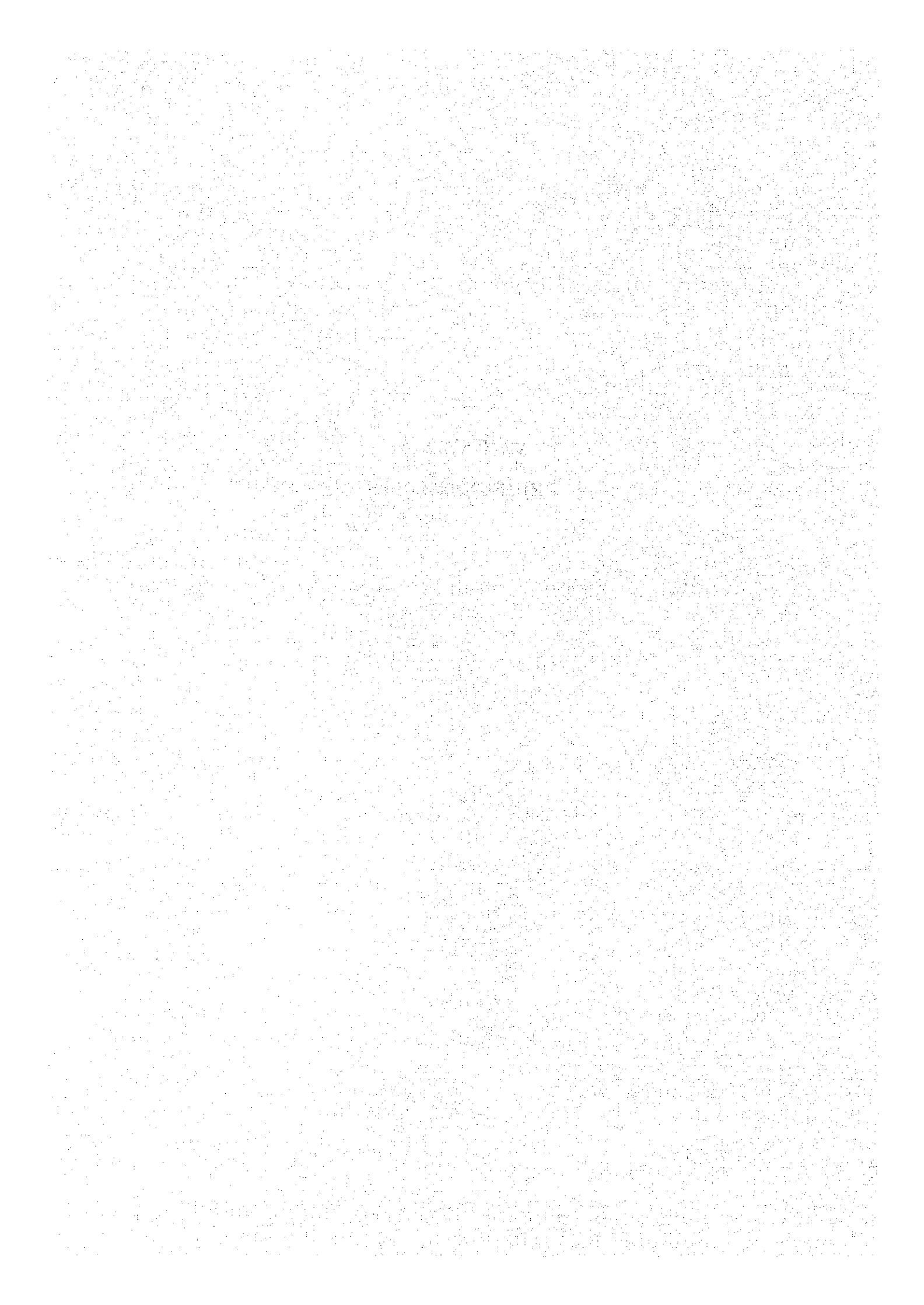
Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
<p>C MINISTRY OF FINANCE</p> <p>1. The Office of Permanent Secretary</p>	<p>Increasing investment budget to BAAC (whole kingdom of BAAC branches)</p>	<ul style="list-style-type: none"> - More equitable distribution of incomes to rural people by providing farmers with credits of medium and long term interest 9% / year, total 1,200 million baht - This is operated according to "Distribution of credit to rural measure" by cabinet resolution of May 7, 1991 that approved BAAC to improve agricultural credit in medium and long term phase 	<ul style="list-style-type: none"> - Giving medium and long term credit to farmers starting from the beginning of project until to 1993, total credit 	<p>4,800,000,000</p>
<p>2. The Office of Permanent Secretary</p>	<p>Accelerated credit to small farmers and poor people</p>	<ul style="list-style-type: none"> - To provide small farmers and poor people with credits for investment of farming, for increasing incomes and products - To extend new agricultural technologies in production, harvest, farm management to small farmers and poor people 	<ul style="list-style-type: none"> - Offering credit to small farmers and poor people at beginning of project until 1994, total credit 5,000 million baht 	<p>500,000,000</p>

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
D MINISTRY OF COMMERCE 1. Business Economics Department	Information and News of Trade	Establishment of an information center on trade both in domestic and abroad for Commerce Ministry to make policies, goals, plans and trade measures including extension of information and trade, and trade news to public and private sectors	<ul style="list-style-type: none"> - Studies, analysis, researches of goals and trade including evaluation of situation, trends and measures for solving problems - Analysis of export conditions and important commodities prospects - Projection of an exports, imports, trade balance including service trade by Thailand - Every three month monitoring of export, import, trade balance including service trades - Analysis of economic and trade dynamic in Thai trading and competitive countries - Analysis of trade shares of goods in important markets 	continuing project for 1990-91-92 55,070,400

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
			<ul style="list-style-type: none"> - Formulation of commercial development plans, co-ordination and monitoring including evaluation of practical plans and projects under responsibility of Commerce Ministry - Training of officers and workers in agricultural goods trading sector - Preparation of speeches for ministers and high rank administrators - Collection of news articles for intelligence activities - Reporting of prices of commodities in both central and local areas - Calculation of consumer indexes, producer indexes and other commercial indexes including analysis and forecasts 	

Executing Agency (Department)	Name of Project	Objectives	Major Project Components	Total Budget (Baht)
			<ul style="list-style-type: none"> - Collection of data, information on second field crop trade and marketing in National Rural Development Project - Distribution of trade information to farmers in Nation Rural Development Project by training, magazines, and videos - Collection and compilation of data on import and exprt of both Thailand and other countries concerned - Collection and compilation of commercial data by computer system both in national and provinces - Analysis of trade prospects of both Thailand and other countries concerned - Distribution of commercial information to public including private businessmen and farmers 	

APPENDIX B
PROJECT PROFILES



PROJECT PROFILE - 1

"LAND LEVELING"

1. **The Project:** The project will level the land owned by the private farmers. This will allow better management of water on the farms and thereby reduce water consumption while increasing yields. Most important, it will promote mechanization of paddy farming, thereby reducing the labor requirements. This will also improve farm yields by allowing farmers to synchronize farm operations with the pattern of rainfall and agronomic requirements.

2. **Justification:** Although statistical information is not available, field observations suggest that the average size of plots operated by farmers is much smaller than the size of land owned/operated by individual farmers. Without mechanized land leveling, the farmers have divided their land holdings into 5 to 10 individually bounded plots so that manual leveling is manageable and the difference between the high and low contours is minimized within the bounded plot.

The division of land into smaller units results in plot sizes of a few rai (compared with an average size of around 30 rai owned/operated by individual farmers) which prevents use of tractors and mechanized harvesting.

3. **Project Components:** The proposed project will provide a combination of land leveling machinery and simple scrapers mounted on tractors. The government agencies will provide technical services in land surveys and insuring the technical quality of work.

Initially, the service will be provided free of charge for demonstration purposes. After the first year, the project will charge farmers for a substantial part of costs. At the same time it will encourage the development of local contractors who will perform the tasks on commercial basis. The tractor mounted scrapers will be sold to these operators in year 2 of project operations.

4. **Project Costs:** The project scale is totally flexible: from a few hundred rai to hundreds of thousands of rai.

The large land leveling machinery will be rented. A few tractors may also be purchased and mounted with small scrapers. The objective of the latter would be demonstration that the leveling can be undertaken by simpler machinery and small local entrepreneurs. The project will hire a team of land surveyors, preferably from a private company, to measure and mark the leveling to be done

The project will also include a farm machinery component. Farmers whose land is leveled should be supplied with tractor hire and mechanized harvest services. One possibility is to cover part of the machine hire costs through a grant for a period of one or two years.

5. **Project Organization:** To be elaborated by NESDB Staff

6. **Project Impact:** Land leveling reduces the water requirements and improves yields. This is due to the possibility of an even level of water compared with an unlevelled field where the water level varies throughout the field.

The project will remove a barrier to mechanization (too small plot size), but by itself will not insure higher levels of mechanization. Once land is leveled and the plot sizes expanded, acquisition of farm machinery should be promoted. This could be done by encouraging some farmers to purchase the machinery and provide custom services to other farmers. There are other possibilities varying from share cropping to profit sharing or payment in kind.

Mechanized farming by itself, without changes in productivity, will increase farmers incomes. There are alternative sources of employment in industry and services, and the opportunity cost of labor in traditional farming is rising rapidly. Second, the cost of buffalos for operating the land (plowing) is probably many times higher than that of tractor operations. Freeing the feed base from buffalos would contribute to the development of an efficient livestock sector.

6. **Issues to be Resolved:** Land leveling will be undertaken when the plots are not planted. This restricts the period (season) over which the work must be done.

Special care needs to be taken where plot consolidation would lead to substantial amount of cut and fill for leveling. The dept of the top soil and sub-soil characteristics need to be carefully examined. Government short term demonstration projects tend to distort the long term development of a viable system. Either measures should be taken to insure that the subsidies for land leveling are restricted to a given period, or the service should be provided free of charge to everybody. In the latter case, the development of a local commercial capacity for land leveling will depend on government contracting practices.

PROJECT PROFILE - 2

SISA KET AGRICULTURE TRAINING CENTER

Location : Si Sa Ket Province

Objective :

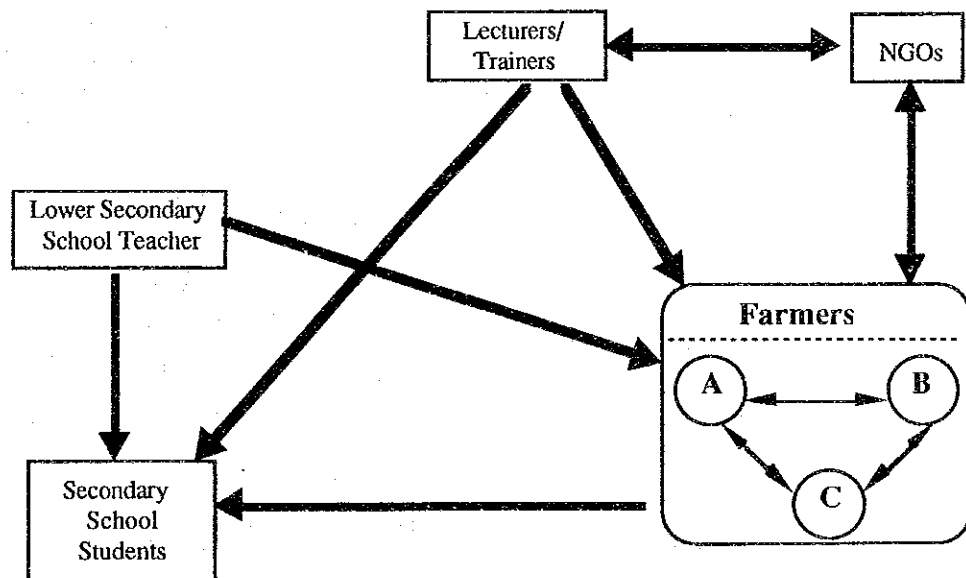
- (1) To provide farmers with an opportunity to learn new possibilities of agriculture production as well as acquire technical information for improved agriculture production.
- (2) To provide lower secondary students an opportunity to learn basic agriculture production practices as preparation for becoming farmers.
- (3) To provide farmers an opportunity to learn basic skills.

Component :

- (1) Land and building
- (2) Equipment
 - Audio visual equipment
 - Vehicle
 - Agriculture machinery

Description :

- (1) The project will provide an opportunity for multi-facet and multi-directional exchange of information among government officers and experts, farmers, NGOs and lower secondary students on both advanced and traditional agriculture production techniques.



Lectures and training by teaching staff will aim at encouraging farmers to venture into promising new types of agriculture production through providing information on technical aspects as well as institutional and economic aspects. The major subjects for training are the following.

- integrated farming
- livestock development
- horticulture crops growing
- water management
- aquaculture
- agro-processing industry
- marketing of agriculture products
- agriculture cooperatives
- government support measures

Teaching staff will be recruited from various sources both on a permanent and temporary basis such as Ministry of Agriculture and Cooperatives and attached institutes, existing universities and agriculture colleges, NGOs and farmers. NGOs are expected to be instrumental in preparing curriculum matched to local needs and locating qualified teaching staff.

An equal importance will be attached to voluntary exchange of information among farmers as to lectures and trainings. Various successful as well as failure experiences will be introduced to participants and opinions for improvement will be exchanged.

- (2) Upgrading in educational level is an important factor to improve agriculture productivity. Participating farmers are able to improve their basic skills such as reading and writing skills and mathematical skills by attending classes to be given by secondary school teachers.
- (3) Some of lower secondary school graduates are potential leading farmers after their graduation. The project will pursue to provide preliminary agriculture courses and trainings to secondary school students to familiarize them with new possibilities in agriculture in changing social and economic circumstances. The idea is "Strike while the iron is hot."
- (4) The project will be planned, implemented and managed under provincial government's strong initiative with cooperation from relevant government agencies such as Ministry of Agriculture and Cooperatives, Ministry of Education and Ministry of Interior. Coordination will be made with similar types of on-going activities such as non-formal education programs on basic skill improvement and agriculture training for adults provided by the Department of Non-Formal Education, Ministry of Education.
- (5) Location of the center will desirably be adjacent to existing secondary school with some experience in agriculture education.

6.	Cost	:		=	
	- Land	:	200,000 baht/rai x 20 rais	=	4,000,000 baht
	- Building	:			15,000,000 baht
	- Equipment	:			1,000,000 baht
			Total		20,000,000 baht

PROJECT PROFILE - 3

YASOTHON AQUACULTURE TRAINING CENTER

- Location** : Yasothon Province
- Objective** : to provide farmers in Isarn in a short to medium-term as well as farmers in the neighboring countries in a medium to long-term trainings on inland aquaculture development as part of an effort to diversify rural economic activities
- Components** : (1) land and building
(2) equipment
(3) attached reservoirs
(4) technical and financial assistance from external source

Description :

- (1) The project forms an important part of Yasothon Aquaculture Center Project proposed as an agriculture development project in the master plan. This project is a follow-up and expansion of "Community Fisheries Management in Rural Reservoirs (Thailand)" implemented by the United Nations through the Mekhong Secretariat with financial assistance by the Netherlands government.
- (2) The rationale for the project is a bright prospect of inland aquaculture development in the coming decades. Fish consumption in the Study Area is only 2.7 kg/person/year at present, while that for the nation is 23.0 kg/person/year. As an important protein source, demand for fish is expected to grow constantly in accordance with improvement in income level.
- (3) Yasothon is selected as the project site considering its on-going engagement in aquaculture development and its strategic location being almost at the center of Isarn and neighboring Indochina countries.
- (4) The project can be effectively integrated with small pumping reservoir projects planned in water resources development. At least three sites were identified for small pumping reservoir development in Yasothon Province.
- (5) Courses and trainings will be provided for the following subjects.
 - fish breeding
 - fish nursing
 - reservoir habitat/stock
 - stocking of fingerlings
 - appropriate reservoir establishment techniques
 - reservoir fishery management

- formation of village pen-culture committee
 - role and participation of women
- (6) Success of the project hinges upon the extent of voluntary participation from farmers. The project, therefore, will try to engage farmers from planning stage all the way through management stage. Government agencies and foreign experts will provide assistance in technical and financial aspects.
- (7) Mobile training units will be established to provide on-site trainings and guidances to farmers in various parts of Isarn.
- (8) Once the project proves to be successful within Isarn, it will start providing trainings to farmers in the neighboring countries as well : Cambodia, Laos and Vietnam.

Cost : 19 x 10⁶ baht *

* Assuming similar magnitude of cost will be required as for "Community Fisheries Management in Rural Reservoirs (Thailand)" by UN.

JICA