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Institutional Analysis of Aquatic Production Systems in Peri-urban Bangkok (Thailand)

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Acronyms and terms

AIT	Asian Institute of Technology, Bangkok
KU	Kasetsart University, Bangkok
<i>klong</i>	Thai name for canal
KVL	Kgl. Veterinær-og Landbohøjskole
NIHE	National Institute of Health and Epidemiology, Hanoi
PAPUSSA	Production in Aquatic Peri-Urban Systems in southeast Asia
PAFPS	Peri-urban aquatic food production systems
PCA	Participatory community assessment
PU	Peri-urban
PUAFPS	Peri-urban aquatic food production system
RIA1	Research Institute for Aquaculture No. 1, Hanoi
RUA	Royal University of Agriculture, Phnom Penh
SOS	State of the System
UAF	University of Agriculture and Forestry, Ho Chi Minh City
UD	University of Durham, UK
UOS	University of Stirling, UK
ACFS	National Bureau of Agricultural Commodity and Food Standards
COC	Code of Conduct

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1. Institutional Analysis

According to the 1st to the 8th National Economic and Social Development Plans, the growth and change in land use in the city and peri-urban areas derived from rapid growth of national economy have resulted in unavoidable deterioration of natural resources and environment. In the 8th and the 9th National Economic and Social Development Plans (2002-2006), emphasis was thus placed on decentralizing authorities to local communities in order to increase cooperation at local level including environmental management. The broader collaboration, extending also to private sector, at lower level has therefore become the main strategy for national administration.

Those national plans have been used as guidelines for city development and planning in order to support business expansion and to meet other urban requirements including those of residents, as well as agricultural and industrial sectors. Bangkok metropolitan itself has been set as centres for cultural activities, business and services as well as government. Therefore, peri-urban areas adjacent to the metropolis have been used to accommodate land requirement of city growth particularly those of manufacturing.

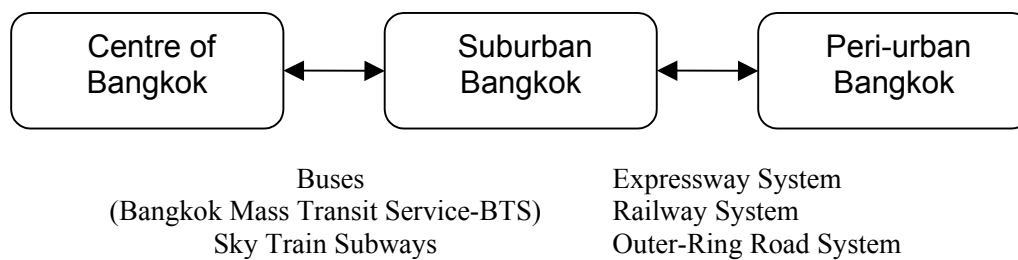


Fig. 1 Bangkok and Peri-urban transportation network

As Bangkok grows land use in suburban and peri-urban area which was originally for agricultural purposes, have been changed to accommodate housing, business and manufacturing. This expansion was often without adequate civil responsibilities, resulting in pollution problems. These problems including water pollution derived from discharge of untreated wastewater are known to have direct and significant effects on aquatic production.

Administrative plans based on the National Economic and Social Development Plan, place central agencies (i.e. Ministries and departments) at the apex in lines of command. They are responsible for implementing plans and policies through their respected provincial and community offices.

At provincial and community levels, authorities concentrate their efforts on planning and implementing local plans and regulations that are consistent with those of central agencies.

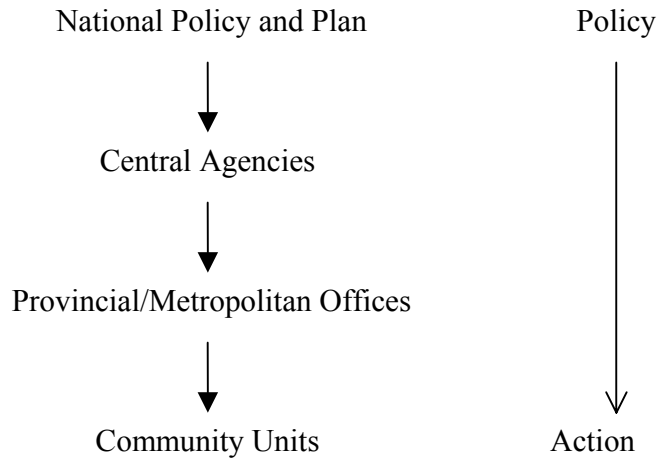


Fig. 2 An Overview of the Government Administrative System

Institutions that involve aquatic production can be divided into 2 groups: central agencies and local offices. They have often been organized with lines of command similar to those used by central agencies to administer local offices, therefore local offices in same way, have similar duties to those of central agencies, but with much narrow scope (local issues). Structure of provincial and community administration are illustrated in Fig. 3 and Fig. 4

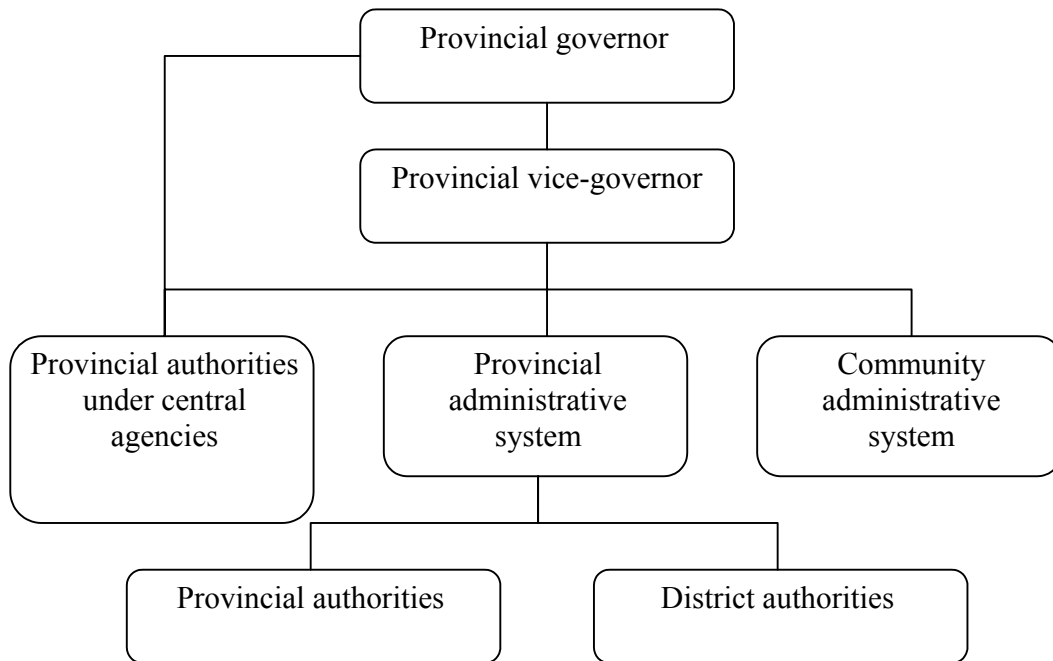


Fig. 3 Structure of Provincial Administration

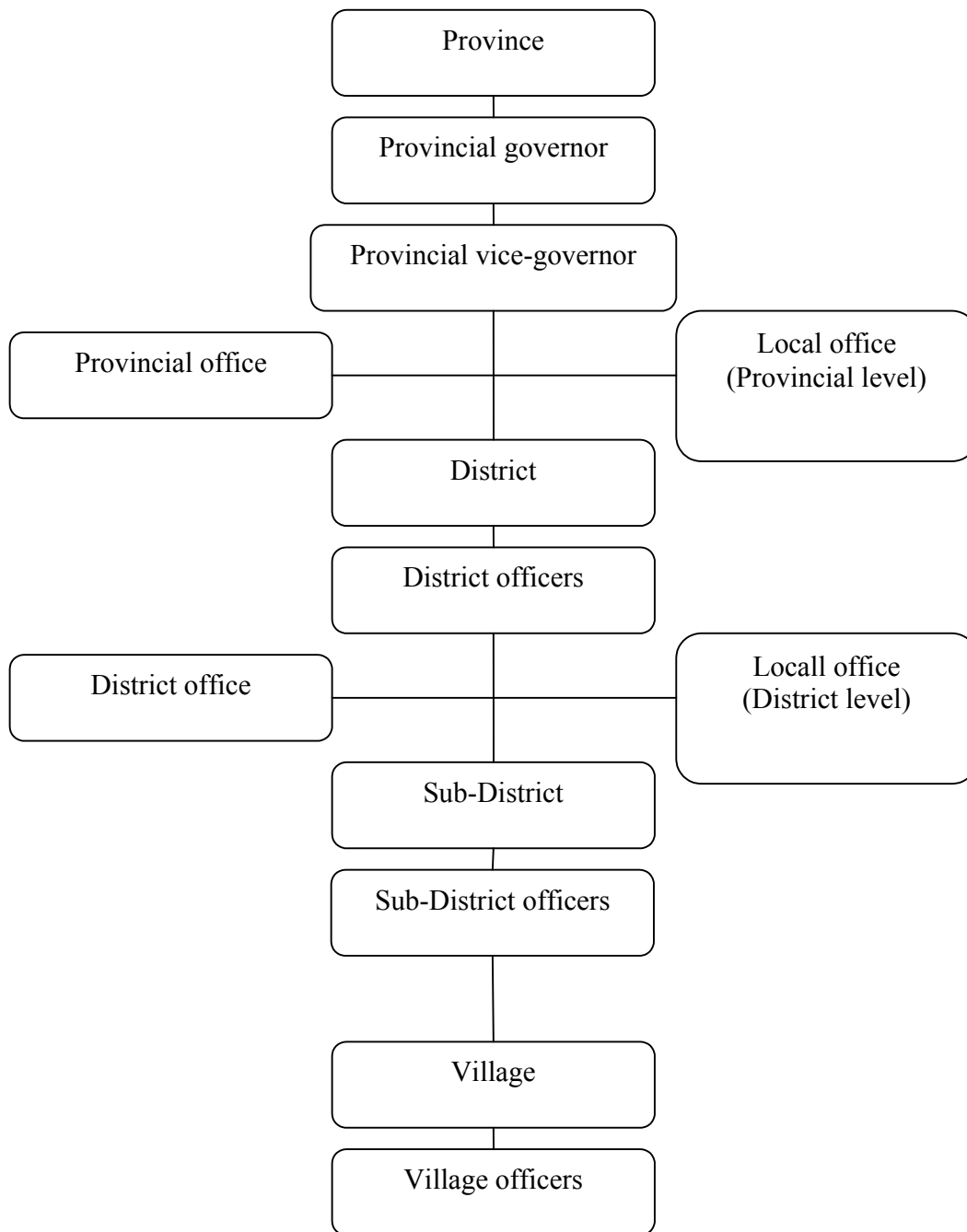


Fig. 4 Structure of Community Administration

1.1 Central agencies involving Aquatic Productions

Institutions that involve with aquatic productions are summarized as follows:

1.1.1 Ministry of Agriculture and Cooperatives

The Ministry of Agriculture and Cooperatives is generally responsible for various agricultural issues such as agricultural economics, land reform, irrigation, fisheries, livestock, forestry, land development, and cooperatives. The ministry is comprised of 13 departments and agencies that involve in aquatic productions are Department of Agriculture, Department of Agriculture Extension, Department of Fishery, The Royal Irrigation Department, Land Development Department, Agriculture Land Reform Office, and Office of Agricultural Economics.

Some state enterprises are also under the supervision of the Ministry of Agriculture and Cooperatives. Marketing Organization for Farmers is the only relevant state of the ministry, however.

- **Department of Agriculture**

The department is mainly responsible for plant experiments and research including services such as analysis of soil, water and chemical agents, and providing knowledge to farmers. The department also maintains and applies standards on agricultural maximum residual limits as well as regulates chemical uses in agriculture.

- **Department of Agricultural Extension**

The department is mainly responsible for providing agricultural information services, including production of publications (e.g. the handbook for enhancement on community agricultural potential project and a promotion on administrative decentralization for good management project).

Notable achievements of the department include establishment of the center of agriculture technology extension, mobile agricultural clinic project, farmer groups and organizations. The department has also carried out a project on processed agricultural product for agricultural housewife and One Tumbol One Product (OTOP) project.

Certification of agricultural commodity standard is currently a pipeline project of the department.

- **Department of Fisheries**

The main responsibilities of the department can be summarized as follows:

1. Implementing various legislation including the 1947 Fisheries Act, the 1992 Wildlife Conservation and Production Act, the 1992 Enhancement and Conservation of National Environmental Quality Act, B.B. 2535 (1992), Hazardous Substance Act.
2. Conducting studies, research, and experiments in every aspect of fisheries.
3. Exploring, analyzing, and studying fishing grounds beyond The Thai waters, and promoting fisheries cooperation with other countries.

4. Promoting and developing all occupations related to fisheries and implementing other duties assigned to the department by Ministry or Cabinet.

Notable projects on aquatic productions that have been carried out by the department include water quality monitoring for aquaculture and commercial fish culture project (ruby fish). In addition, the department is responsible for regulating chemical uses in aquaculture and for developing Code of Conduct (COC) for aquaculture. Other on-going projects on aquatic production are organic aquaculture promotion, Good Aquaculture Practice (GAP), aquatic fish quality improvement and aquaculturist registration.

- **Royal Irrigation Department**

The Royal Irrigation Department is entrusted with the duty to secure adequate water supply for agriculture, energy production, domestic consumption, industries; to prevent serious flooding damage, and to regulate inland navigation in irrigation areas are among on-going projects of the department with significant influence on aquatic production systems. The Royal initiatives on waste water treatment (by natural methods) in Bangkok Metropolitan area, action against water shortage and flood problems and irrigation projects.

- **Land Development Department**

Land Development Department is responsible for soil survey and classification, soil analysis, land use planning, experiments on land development, assisting farmers in soil and water conservation and soil improvement, production of seeds for cover crops and soil improvement materials, technology transfers and Land Legislation Act. Further duties of the department are described as follows:

1. To conduct soil surveys and produce soil resource maps, including survey to obtain census of land data concerning land economics.
2. To conduct land use planning for sustainable use of land resources.
3. To conduct research and experiments related to soil, land improvement, soil and water conservation, watershed conservation, and other issues concerning land development and farmers' requests.
4. To disseminate land development technologies to relevant government personnel, farmers, and interested public.

The notable on-going projects related to aquatic production are soil science research, soil database management and monitoring, water resources conservation and development projects, agricultural zoning, GIS and MIS systems, mobile soil clinic and extension services.

- **Agricultural Land Reform Office (ALRO)**

The main responsibilities of the agency include;

1. To provide public and private lands for agricultural land reform
2. To allocate lands to farmers through provision of lease, hire-purchase and right of land ownership.

3. To enhance infrastructure, occupation, income in farming sector and to monitor land holding right of farmer and their land use.
4. To create land registration action, to classify land use and to protect land for agricultural use.
5. To conduct studies and research and to enhance knowledge on agricultural land reform.
6. To solve land problems in various private sector.
7. To rehabilitate the environment and to make use of the resources in land reform areas.

Land allocation to farmers under land reform program is a notable on-going project of the office that is related directly to aquatic production. As for the agency, ALRO operates in accordance to its master plan, annual budget, support private sector and foreign agencies in specific areas. Furthermore, ALRO has departments on land reform also.

- **Office of Agricultural Economics**

The agency is responsible for evaluating agricultural policy and development plans, agricultural zoning, analysis of agricultural commodities and markets, and managing agricultural database.

- **National Bureau of Agricultural Commodity and Food Standards (ACFS)**

The Bureau is responsible for issuing quality assurance certificates for agricultural commodities, developing standard on agricultural commodities, inspecting agricultural commodities and registering agricultural production and producers.

- **Marketing Organization for Farmers**

In addition to establishment of a central agricultural market system, the state enterprise is responsible for maintaining optimal prices of agricultural commodities and representing the Government in selling major agricultural products. Selling of chemical fertilizer to farmers, buying rice from farmers and rice marketing projects are among notable on-going activities of the organization.

1.2 Central-agencies Supporting Aquatic Productions

Institutions that support aquatic productions are briefly described as follows:

1.2.1 Ministry of Natural Resources and Environment

The ministry is mainly responsible for conserving, enhancing and restoring natural resources and the environment for sustainable uses, and supporting cooperation between communities, authorities and private sectors in administration and management of natural resources and the environment. Under the ministry, agencies that support aquatic production include Pollution Control Department, Office of Natural Resource and Environmental Policy and Planning, Department of Water Resources and Wastewater Management Authority.

- **Pollution Control Department**

The Pollution Control Department has the following functions:

1. To support formulation of national policies and plans on environmental quality conservation and promotion by contributing to sections on pollution control,
2. To identify and recommend environmental quality and emission/effluent standards,
3. To formulate plans for environmental quality management which includes measures to control, prevent and remedy environmental problems caused by pollution,
4. To monitor national environmental quality and prepare annual reports on the state of the pollution,
5. To develop systems, methodologies and technologies, which are appropriate in application to the better management of water quality, air quality, noise pollution, hazardous substances and solid waste,
6. To perform activities specified in the 1992 *Enhancement and Conservation of National Environmental Quality Act* concerning pollution control,
7. To take actions on public complaints related to pollution,
8. To carry out other tasks as assigned by other laws.

Current tasks at the department can be summarized as follows:

1. Implementing the water quality standards with monitoring, inspection and enforcement. (Drinking water, water quality for freshwater aquaculture, ground and surface waters and industrial & housing estate effluents).
2. Ensuring environmental management in community.
3. Developing wastewater treatment systems.
4. Organizing public relations activities on water quality and its management with publicity and campaigning.
5. Undertaking research related to water quality.

- **Office of Natural Resource and Environmental Policy and Planning**

The agency was assigned by law to carry out these following duties:

1. To formulate the Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality as well as monitor and evaluate their implementation and integration in policy sectors.
2. To coordinate formulation of Environmental Quality Management Plan in accordance to the 1992 Enhancement and Conservation of National Environmental Quality Act.
3. To monitor, audit and formulate the State of the Environment Reports.
4. To coordinate natural resources management between the Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality, the National Economic and Social Development Plan, and the Environmental Quality Management Plan.
5. To carry out environmental impact assessments for projects or activities likely to have significant environmental impacts, of any government agency or individual.

6. To identify national position and direction in international co-operations and obligations on the environment.
7. To formulate policy and guidelines for the Environmental Fund, to coordinate its administration and management, as well as to mobilize funding for the Environmental Fund as mandated by the Enhancement and Conservation of National Environmental Quality Act.
8. To carry out tasks assigned by other laws or the Ministry or the Cabinet.

On-going activities of the agency include:

1. Enforcing the 1992-2016 Enhancement and Conservation of the National Environmental Quality Act.
2. Facilitating action plans for provincial and community environmental management
3. Undertaking research related to natural resources and environment.
4. Enabling environmental zoning, using economic value.
5. Carrying out a project on economic application for natural resource and environmental management for communities.

- **Department of Water Resources**

The department is responsible for water resource utilization and conservation. Water resource conservation and management extension and training, a project on community settlement to reduce waste disposal and water resource information services are among notable on-going projects of the department.

- **Wastewater Management Authority (WMA)**

The state enterprise was assigned with the following duties:

1. To establish central wastewater treatment systems in order to provide wastewater treatment services. The systems were initially established in the lower Chao Phraya River and Tha-Chin River Basins which are considered as the country's most critically polluted areas consisting of Bangkok Metropolis, Nakhon Pathom Province, Nonthaburi Province, Pathum Thani Province, Samut Prakarn Province and Samut Sakhon Province. Further expansion of the system can only be made with the Cabinet's approval. On April 5, 1999, the Cabinet approved such expansion in Chachoensao Province, Ang Thong Province, and Saensuk Municipality of Chonburi Province and authorized WMA to operate and maintain the systems in the 3 provinces.
2. To provide additional wastewater management, such as wastewater recycling or producing energy from wastewater.

1.2.2 Ministry of Interior

The ministry is responsible for administrative system, economic promotion, and society development and planning. Under the ministry, departments that support aquatic production systems include Community Development Department, Department of Lands,

Public Works Department, and Department of Provincial Administration Bangkok Metropolitan Administration (BMA).

- **Community Development Department**

The department has been carrying out several projects to support aquatic production systems. These include:

1. Computing poverty with strengthening community economy through One Tumbol One Product (OTOP) project.
2. Account trade system.
3. One million Baht Community Fund project.
4. Community database management.

- **Department of Lands**

The department is responsible for issuing title deeds to land owners, allocating land to people in accordance to the Land Act and assessing land value.

Public Works Department

The department is mainly responsible for:

1. Implementation of city planning and land use planning.
2. Industrial and agricultural zoning.
3. Constructing infrastructure (e.g. bridges, roads, wastewater treatment plants and solid waste treatment plants).

- **Department of Provincial Administration**

The department has a vital role in supporting a system to decentralize administration to community level.

Bangkok Metropolitan Administration (BMA)

BMA has played an important role in supporting aquatic production in peri-urban areas through implementation following activities.

1. Royal initiated projects include flood protection system and waste water treatment system.
2. Bangkok wastewater treatment projects.
3. Bangkok infrastructure development projects.
4. Community health center project.
5. Food corner for Bangkokian.
6. Agricultural promotion project.
7. Initiation and expansion of Bangkok mass transit systems (BTS).
8. A study on Urban Development Master Plan-Making within the Industrial Outer Ring Roads.

1.2.3 Ministry of Finance

As defined in The Public Administration Act, the ministry is authorized to oversee matters concerning public finance, taxation, treasury, government property,

operations of governmental monopolies, revenue-generating enterprises. Those businesses can be legally operated only by the Government and not under the purview of other Government bodies, as well as other organizations to which the Government has contractual obligations. It is also empowered to provide loan guarantees for governmental agencies, financial institutions, and state enterprises. Under the ministry, organizations that support aquatic production system are Bank for Agriculture and Agricultural Cooperatives (BAAC) and Treasury Department.

- **Bank for Agriculture and Agricultural Cooperatives (BAAC)**

The bank is responsible for several local agricultural financing issues such as change in economy, strength of people organizations and their participatory role, chronic debts of farmers, reviving and strengthening the economic systems with the rural SMEs as well as self-management of the bank under governmental policies. Services provided by BAAC include credit services, deposit and consequential services and financial and banking services.

- **Treasury Department**

The department supports aquatic production systems through management of state properties, which include maintenance of state properties and cost effective procurement of their benefits

1.2.4 Ministry of Commerce

The ministry is responsible for:

1. Generating revenue.
2. Strengthening national economy of internal trade system.
3. Strengthening and protecting consumer's interest.

Department of Internal Trade supports aquatic production through its involvement in market and pricing system.

- **Department of Internal Trade**

The department's responsibilities include:

1. Implementing tasks mandated by the Rice Survey and Prohibition of Rice Over Stocking Act, the Rice Trading Act, Business Competition Act, Price on Goods and Services Act, the Act on Control of Consumable Goods and other Articles in the State of Emergency, the Commodity Control Act, the Trade Association Act, the Chamber of Commerce Act, Thai Shipper's Council Act, the Laws concerning Control on Business of Warehouse, Silo and Cold Storage Act and other relevant Acts.
2. Formulating, coordinating and undertaking actions consistent with policies and master plans of the Ministry of Commerce, supervising implementation monitoring and evaluation of the plan's performance and price in collecting data.
3. Promoting trade, marketing and domestic market.

4. Regulating and promoting trade system in order to stabilize price in agricultural products.
5. Promoting fair trade competition, and controlling monopoly.
6. Regulating trade flow with identification of marketing indices
7. Identifying all series of economic indices, in order to evaluate the business trend.
8. Protecting consumer's rights including development of consumer institutions, consumer's awareness of their role in protecting themselves.
9. Carrying out other tasks which mandated by the laws or assigned by the ministry or the Cabinet.

The department is currently carrying out three main issues as follow:

1. Agricultural Central Market Policy
2. Contract Market
3. Agricultural Price and Market Assistance Subcommittee

The Agricultural Price and Market Assistance Subcommittee is responsible for:

1. Scrutinizing and providing suggestions on farmer assistance plans or projects related to agricultural price and market, including those proposed by other authorities to the Farmers Assisting Policy and Measures Committee.
2. Contemplating, studying, analyzing and monitoring situations of agricultural markets in order to recommend principles, procedures or measures for systematic assistance to farmers.
3. Proposing intervention in agricultural market for particular products including determining acceptable level of revenue for farmers and target prices for agricultural products.
4. Monitoring and regulating authorities responsible in intervening markets.
5. Censuring coordination with other concerned authorities, including Farmers Assisting Policy and Measures Committee.

1.2.5 Ministry of Public Health

The ministry is mainly responsible for maintaining health of general public under the ministry; Department of Health and Department of Disease Control play certain roles in supporting aquatic production systems.

- **Department of Health and,**
- **Department of Disease Control**

These departments are involved in aquatic food production through the following activities:

1. Food safety program
2. Clean Food Good Taste program
3. Clean Fresh Market program
4. Control of Leptospirosis

“Healthy city” and ‘a standard for fresh market owners’ projects are to be further implemented by the department in the near future.

1.2.6 Ministry of Industry

The Ministry of Industry is responsible for industrial promotion and development, investment promotion, entrepreneur development, and other tasks specified by laws. Missions of the ministry can be summarized as follows:

1. To identify directions and formulate strategies for development of industries, small and medium enterprises, and entrepreneurs of the ever changing world.
2. To rapidly and continuously increase competitive capacities and competencies of industries, small and medium enterprises, and entrepreneurs.
3. To supervise and advise industries, small and medium enterprises, and entrepreneurs on operating within scopes of laws and policies.

Under the Ministry of Industry, supports to aquatic production are provided by Department of Industrial Works.

- **Department of Industrial Works**

The department is responsible for monitoring and regulating industrial plants. These include monitoring of hazardous waste and effluent treatment, implementing standards and regulations on chemical usages and safe industrial technologies and issuing industry licenses.

1.2.7 Ministry of Education

Research and development activities from academic institutions enable the ministry to provide valuable technical support to aquatic production. These institutions include:

1. Kasetsart University: Faculty of Fisheries, Faculty of Agriculture, Faculty of Agro-Industry and Faculty of Science
2. Asian Institute of Technology (AIT – Private Institute): Research projects that are directly related to aquatic production include a study on heavy metal accumulation in morning glory, a study in a morning glory use as a bio-indicator for heavy metal detection. And a study on a morning glory use as bio-accumulator for Hg, Cd and Pb. The up-coming projects in the next 5 years such as a study on an aquatic plant as a bio-remediation and a clean river project is also of direct relevance.

1.2.8 Office of Prime Minister

Under National Economic And Social Department Board(NESDB) contributes to aquatic production through realization of existing duties as follows the Office of Prime Minister.

1. Formulating five-year plans and annual development plans.
2. Studying, analyzing, and recommending solutions for development problems, and identifying development opportunities.

3. Appraising development projects described in the National Plan before their implementation.
4. Coordinating implementation of development programs and projects derived from policies in the Plan.
5. Monitoring and evaluating development programs and projects.
6. Enhancing communication.