

Date: March 8, 2012

**Environmental and Social Considerations in Detailed Planning Survey
(Technical Cooperation for Development Planning)**

1. Full title of the Project

Project for Flood Countermeasures for Thailand Agricultural Sector

2. Type of the study (e.g. Master Plan, Feasibility Study, Detailed Design, etc.)

Recovery Plan and Medium- and Long-term Guideline Development

3. Categorization and its reason

(1) Category: B

(2) Reason:

The project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the JICA guidelines for environmental and social considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.

4. Agency or institution responsible for the implementation of the project

Ministry of Agriculture and Cooperative (MOAC)

5. Outline of the Project (objectives, justification, location, proposed activities, and scope of the study)

5.1. Expected Goals which will be attained after the Project Completion

(1) Goal of the Proposed Plan

Recovery of agricultural damages from 2011 flood is promoted as well as medium and long-term plan for mitigating agricultural damages caused by flood is prepared.

(2) Goal which will be attained by utilizing the Proposed Plan

Agricultural damages caused by big-scale flood are reduced.

5.2. Location

Chao Phraya River Basin and other related area

5.3. Outputs

Component 1: Improvement plan on pasture reproduction support is proposed

Component 2: Guideline on rehabilitation and reinforcement of irrigation facilities is proposed

Component 3: Guideline on disaster-resilient agriculture and agricultural community planning is developed

5.4. Activities

(1) Component 1: Supports for reproduction of pastures

- 1-1. Monitoring on the distribution of fertilizer and planting materials
- 1-2. Training on sustainable production of pasture
- 1-3. Proposition of quick recovery plan of pasture production after the flood

(2) Component 2: Rehabilitation and reinforcement of irrigation facilities

- 2-1. Technical advices on recovering works for irrigation facilities
- 2-2. Prioritization, outline design and a part of construction work on reinforcement of irrigation facilities
- 2-3. Proposition of medium- and long-term reinforcement guideline of irrigation facilities based on the analysis on the causes of damages
- 2-4. Damage assessment and consideration of measures for JICA supported irrigation and other agriculture related facilities

(3) Component 3: Development of the guideline for disaster-resilient agriculture and agricultural community

- 3-1. Selection and grasp in detail of model areas
- 3-2. Detailed damage assessment in model areas
- 3-3. Assessment of causes of damages in model areas
- 3-4. Listing up and comparison of flood damage mitigation options
- 3-5. Alignment between Flood damage mitigation options and government policy as well as comprehensive flood management plan for the Chao Phraya river basin
- 3-6. Implementation of flood damage mitigation options through model projects
- 3-7. Development of the plan on disaster-resilient agriculture and agricultural community in each model area
- 3-8. Development of the guideline for disaster-resilient agriculture and agricultural community planning

6. Description of the project site (maps, environmental and social condition, current issues, etc.)

6.1. Location Map of the Project Site

Chao Phraya River Basin and other related area in general.

Component 1 targets all pasture fields affected by 2011 flood located in 26 provinces showed in red in figure 1.

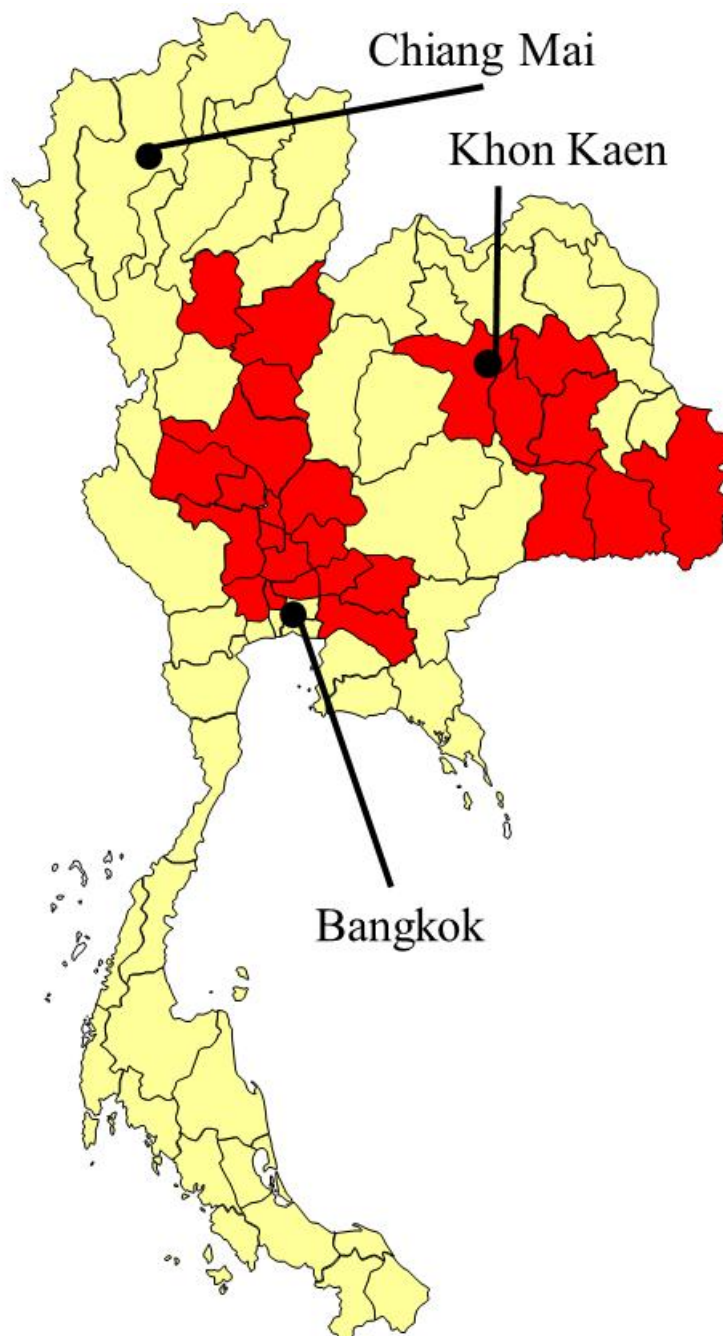


Figure 1 Location of pasture fields affected by 2011 flood

Component 2 targets mainly Chao Phraya river basin, except activity 2-4 that covers all flood affected areas.

Component 3 targets mainly Chao Phraya river basin, especially the areas often inundated by flood water.

6.2. Environmental and social condition

6.2.1. Environmental condition

(1) Geography

The Chao Phraya River Basin covers an area of approximately 160,000 km², which is representing 30 % of the total country area. It starts at the confluence of the Ping and Nan rivers at Nakhon Sawan to the Gulf of Thailand and the Pacific Ocean with 372 km of the whole length. Bangkok, the capital and biggest center of the country's activities with more than 8 million people, is located near the mouth of the Chao Phraya River.

The upper region of the basin is mountainous with agriculturally productive valley, and covers the area of approx. 103,000 km² occupying 65 % of the total basin area. The lower region, however, has alluvial plains with a highly productivity for agriculture.

(2) Climate

Monsoon weather dominantly influences the basin, with a rainy season lasting from May to October and over 1,400 mm of annual precipitation. Temperatures range from 15°C in December to 40°C in April except in high altitude locations. The whole basin can be classified as a tropical rainforest with high biodiversity. The lower part has extensive irrigation networks and hence intensive rice paddy cultivation.

(3) Water resources

(3)-1. Surface water

The Chao Phraya River originates from the mountainous part of the northern area and consists of four large tributaries: the Ping, Wang, Yom and Nan Rivers. Since 1950, the government has constructed some 3,000 dams to store the rainfall in the monsoon season for release in the dry season. This enables them to exploit the basin's vast agricultural potential and to meet the growing demands of industrial and urban users.

Among them, the two largest dams are the Bhumiphol and Sirikit dams, which work for supplying stored water for electricity generation, irrigation, and domestic and industrial water use. Together these two dams control the runoff from 22 percent of the entire basin area. Bhumiphol dam on the Ping River has a live storage capacity of 9.7 billion cubic metres (bm³), compared to the average annual inflow of 6.6 bm³ from a drainage basin of 26,400 km². The

installed hydroelectricity generation capacity is 713 megawatts (MW).

Sirikit dam on the Nan River, completed in 1972 has a live storage capacity of 6.0 bm^3 . The capacity of hydroelectricity generation is 500 MW. Other large-scale dams including Kiew Lom, Mae Ngat, Mae Kuang, Mae Chang, Thap Salao and Kra Sieo have also been built during the last three decades in order to increase the total surface water storage in the basin.

According to a water quality monitoring survey in 2009 by PCD targeting 48 major rivers and 4 standing surface water resources (Kwan Phayao, Bueng Boraphet, Nong Han and Songkhla Lake), it was revealed water quality in the level of good, fair and deteriorated conditions were in the proportion of 31%, 36% and 33%, respectively. This was due to many factors such as rainfall level and flooding. Focusing on the Chao Phraya river, the water quality in the upper and central areas marked “fair”, respectively. However, in the lower area along Bangkok and other populated regions the quality was worse remarking “deteriorated”.

(3)-2. Ground water

The Chao Phraya River Basin is hydro-geologically comprised of seven groundwater sub-basins: Chiangmai-Lampoon, Lampang, Payao, Prae, Nan, Upper Chao Phraya and Lower Chao Phraya Basins. Within these groundwater sub-basins, water is held in either confined or unconfined aquifers. Eight separated confined aquifers are located in the upper tertiary to the Bangkok area. The natural groundwater within this succession of aquifers is highly confined, creating artesian conditions in each. Ease of exploitation as well as the high chemical quality, are the main reasons for the original development of this source. Estimations of groundwater storage and renewable resources in the whole sub-basins are approx. 14 and 2.8 bm^3 , respectively.

The average salinity of the groundwater in the unconfined aquifers shows a general increase in the downstream direction, with the exception of the Ping catchment whose lowest salinity level is comparatively high for its upper catchment location. The groundwater with the lowest salinity comes from the Wang catchment. Nitrate concentrations are almost invariably low in all catchments. The extent to which chemical quality is affected by contamination is not known, except in some specific areas.

6.2.2. Social condition

(1) Demography

The population in Thailand is approximately 64 million, of which 9.3 million live in Bangkok and its vicinities. Ninety-four (94) percent of the population is Thai-speaking Buddhists. The national population growth rate is 0.68%, according to the 2006 census. About 93% of the people in Thailand are functionally literate.

The Basin has some 40 percent of the country's population. The total population of the Chao Phraya Basin was 23 million inhabitants according a survey in 1996. About half of the population (11.5 million) resides in the Lower Chao Phraya Basin, in which the highly populated areas of Bangkok Metropolitan Area – BMA. Approx. 68 percent of the total population of the basin is rural. The average population density is 136 inhabitants per km², but varies greatly from 44 in the Nan sub-basin to 533 inhabitants per km² in the Chao Phraya sub-basin. Bangkok and its vicinity have the highest population density, with 1,500 inhabitants per km².

(2) Economy

Thailand experienced firm growth from 2000 to 2007 - averaging more than 4% per year- thanks to a developed infrastructure, a free-enterprise economy, generally pro-investment policies, and strong export industries, after recovering from the Asian financial crisis of 1997-98.

After the global financial crisis of 2008-09, Thailand's economy expanded 7.8%, with the fastest pace since 1995 in 2010. However, steady economic growth at just below 4% for most of 2011 was interrupted by historic flooding in October and November in the industrial areas north of Bangkok.

The Chao Phraya River Basin employs 78% of nation's work force and generates over two-thirds of the country's GDP. The BMA contributes 78% of the total GDP of the basin. Regarding the GDP distribution of industry in the basin, manufacturing is dominant for 33%, following wholesale and retail trade for 17%, while about 5% in agriculture.

6.3. Current issues

67 out of 77 provinces in the Northeast, East and Central regions of Thailand were affected by the disastrous flood in 2011. Since a number of farmers in the basin have lost their crops, livestock and assets, early recovery of damaged agricultural area and protection measures against future disaster are required to secure their livelihoods. The project scope mainly covers reproduction of 3,200 ha of flood-hit pastures, damaged irrigation facilities and rural communities in the Chao Phraya delta in the basin.

7. Legal Framework of Environmental and Social Considerations

7.1. Laws, regulations and standards related to environmental and social issues including requirements and procedures of Environmental Impact Assessment (EIA), stakeholder participation, and information disclosure.

7.1.1. Laws, regulations and standards related to environmental and social considerations

The first law regarding the environment in Thailand was the Improvement and Conservation of National Environmental Quality Act in 1975, which was established the National Environmental Board (NEB). Later, the Office of National Environmental Board (ONEB), which was in charge to develop environmental policies, embarked on planning of environmental conservation policies and prescription of air and water quality standards as well as establishment of environmental monitoring systems.

After developing the domestic industry and increasing in the people's concern to the pollution in 1980s, the government repealed the 1975 National Environmental Quality Act and replaced it with the Enhancement and Conservation of National Environmental Quality Act in 1992 (NEQA). At the same time, a number of other laws closely relating to environmental policies were substantially revised, including the Factory Act, Public Health Act, Hazardous Substances Act, and Energy Conservation Promotion Act.

The NEQA contains 7 chapters having 111 sections and another 4 sections as interim provisions, a total of 115 sections. In the act, precautions of pollution problems from activities or projects which may have impacts on environment, namely the Environmental Impact Assessment (EIA) are required. The EIA requires pollution mitigation measures and pollution monitoring system, which shall be considered by the assessment committee prior to project approval. In case that the EIA does not pass the assessment, the activity or project will not be approved.

7.1.2 Requirements and procedures of Environmental Impact Assessment (EIA)

(1) Requirements of EIA

EIA reports are currently required for 29 types and sizes of projects or activities, ranging from public works such as dam or reservoir construction to private-sector projects such as petrochemical plant construction. The list of projects or activities which requires an EIA report is as in Table 7-1.

Table 7-1 The list of projects or activities subjected to EIA

	Type of projects or Activities	Size
1	Dam or reservoir	With storage volume of 100,000,000 m ³ or more, or storage surface area of 15 km ² or more
2	Irrigation	Irrigated area of 80,000 rai (12,800 hectares or more)
3	Highway or road as defined by the Highway Act, passing through following areas: 1) Wildlife sanctuaries and wildlife non-hunting areas as defined by the Wildlife Conservation and Protection	All projects with equivalents to or above the minimum standard of rural highway, including road expansion on existing route

	Act 2)National park as defied by the National Park Act 3)Watershed area classified as class 2 by the Cabinet Resolution 4)Mangrove forests designated as the National Forest Reserve 5)Coastal area within 50 meters of high tide level	
4	Commercial port	With capacity for vessel of 500t or more
5	Commercial airport	All size
6	Mass transit system under the Mass Transit System and Expressway Act or project as the same characteristic or mass transit which use rail	All size
7	Coastal land reclamation	All size
8	All type of projects located in the areas approved by the Cabinet as class 1B watershed area	All size
9	Petrochemical industry	Using raw materials which are produced from oil refining and or natural gas separation, with production capacity of 100t/day or more
10	Oil refinery	All size
11	Natural gas separation or processing	All size
12	Chlor-alkaline industry requiring sodium chloride (NaCl) as raw materials for production of sodium carbonate (Na ₂ CO ₃), sodium hydroxide (NaOH), hydro chloric acid, chlorine (Cl ₂), sodium hypo-chloride (NaOCl) and bleaching power	Production capacity of each or combined productions of 100t/day or more
13	Irons and/or steel industry	Production capacity of 100t/day or more (production capacity shall be calculated by using ton/hour furnaces capacity multiply by 24 hours)
14	Cement industry	All size
15	Smelting industry other than iron and steel	Production capacity 50t/day or more
16	Pulp Industry	Production capacity 50t/day or more
17	Pesticide industry producing active ingredient by chemical process	All size
18	Chemical fertilizers industry using chemical process	All size
19	Central waste treatment plant as defined by the Industry Act	All size
20	Sugar industry 1)producing raw sugar, white super, refined sugar 2)producing glucose, dextrose, fructose or the like	1)All size 2)Production capacity 20t/day or more
21	Industrial estate as defined by the Industrial Estate Authority of Thailand Act or projects with similar feature	All size

22	Thermal power plant	Capacity 10MW or more
23	Petroleum development 1)Geophysical drilling, exploration and/or production 2)Oil and gas pipeline system	1)All size 2)All size
24	Mining as defined by the Mineral Act	All size
25	Hotel or resort facility	80 rooms or more
26	Residential building as defined by the Building Control Act	80 rooms or more
27	Building in areas adjacent to river, coastal area, lake or beach or in the vicinity of national parks or historical park which environmental quality	With height of 23 meters or more, or total floor area or individual floor area in the building is 10,000 m ² or more
28	Land allocation of residential or commercial purpose	500 land plots or more or total developed area exceed 100 rai (16 hectares)
29	Hospital which located 1)in area adjacent to river, coastal area, lake or beach 2)in area other than 1)	1)With 30 patient's beds or more 2)With 60 patient's beds or more

Source: Japanese Ministry of the Environment (1999), Overseas Environmental Measures of Japanese Companies (Thailand)

(2) Procedures of EIA

< Process of reviewing an EIA report >

For private-sector development projects which require the EIA, the proponent of the project must prepare two copies of an EIA report, submit one copy to the Office of Environmental Policy and Planning (OEPP), and the other copy to the government agency that has jurisdiction over the project.

On receiving an EIA report, the OEPP must examine the documents within 15 days, and then, within the next 15 days, refer the report together with comments based on a preliminary review to an expert review committee. This committee has 45 days to review the referred report and to decide whether to give approval. However, in case the report is judged incomplete, the expert review committee will request the project applicant to submit a revised report. The government agency with jurisdiction over the project considers whether to grant a license after the EIA is approved by the expert review committee.

Regarding government projects requiring Cabinet approval, the procedure is slightly different from private-sector projects mentioned above. In the case, the entity of the project must submit an EIA report to the National Environment Board (NEB), which reviews the report and hears the opinions of the OEPP and expert review committee. The NEB then reports its conclusions to the Cabinet. The Cabinet considers whether to grant approval, having reviewed the project on the basis of the NEB recommendations and experts' opinions.

< Requirement in an EIA report >

According to the guideline for preparing the EIA report, the following contents are required:

1 Main content

1.1. Executive summary shall comprise the following issues:

1.1.1. Type and size of the project including all related activities

1.1.2. Site of the project: photos and map of the site showing environmental surroundings, which may be affected from the project. Scale of map shall be 1: 50,000 or as appropriate.

1.1.3. Alternative options of the project site and the project implementation methodology: describe reasons and justifications of the options proposed.

1.1.4. A report describing important impact to environment, mitigation and monitoring measure in compliance with a Sor Por 1 Form attached with this Notification.

1.2. Main report shall comprise the following issues:

1.2.1. Introduction: describe background, objective, justification of the project, including objective, scope and methodology of the EIA report.

1.2.2. Site of the project: photos and map of the site showing environmental surroundings, which may be affected from the project. Scale of map shall be 1: 50,000 or as appropriate.

1.2.3. Detail of the project: describe a clear overview detail of the project such as type and size of the project, project implementation methodology, detail procedure or related project activities, layout of land utilization of the project in appropriate scale and direction.

1.2.4. Present environmental condition: describe detail together with photos of natural resources and environment in both physical and biological aspects by classifying into capacity of rehabilitation and non-rehabilitation; human use value; quality of life value; as well as current problems around the site with photos, environmental conditions in surrounding area; utilization of land around the site and in other areas that may be affected from the project in short term and long term.

1.2.5. Evaluation of the alternative option for implementing the project and evaluation of the impact that may cause by the project.

(1) Alternative option for implementing the project: the EIA report shall describe alternative option, which may be the option for the project site or the project implementation methodology. Every proposed option shall be in line with the project's objective and shall describe reasons addressing to the project's goal and necessity either the project exists or non-exists. Mitigation measure shall be proposed in each option. The most suitable option shall be identified with justification and reasons.

- (2) Evaluation of environmental impact: evaluation of environmental impact, both direct and indirect that may occur to natural resources and environment and to all values mentioned in 1.2.4 shall be described. Natural resources shall be classified to rehabilitation and non-rehabilitation. All possible impacts that may occur from the proposed options shall be evaluated and compared.
- 1.2.6. Mitigation and compensation measure: detail of mitigation measure caused by 1.2.5 shall be described. In case of an unavoidable damage, compensation to the damage shall also be described.
- 1.2.7. Environmental quality monitoring measure: environmental monitoring plan, which is technically and practically suitable for the project, shall be proposed. This monitoring plan will be a part of the project's post monitoring and evaluation.
- 1.2.8. Table summarizing important environmental impact and mitigation measure.

The EIA report shall be conducted on the basis of public participation and social environmental impact assessment guideline, as well as the health impact assessment guideline.

2. Attached document and evidence

- 2.1. Full report for not less than 15 copies
- 2.2. Executive summary for not less than 15 copies
- 2.3. Front cover and title page of the EIA report, in the pointed form
- 2.4. Certified letter of the EIA report preparation, in the pointed form
- 2.5. A copy of a permit to make the EIA report
- 2.6. List of the EIA study team, in the pointed form
- 2.7. Submission form of the EIA report, in the pointed form

Source: General Guidelines in Preparing EIA report (2004, Office of Natural Resources and Environmental Policy and Planning (ONEP))

7.1.3 Stakeholder participation and information disclosure

The Constitution of Thailand in 2007, the latest version, defined the rights of people to participate and get information in environmental issues.

“Article 67 - The right of person to participate with State and communities in the preservation and exploitation of natural resources and biological diversity and in the protection, promotion and conservation of the quality of the environment for usual and consistent survival in the environment which is not hazardous to his health and sanitary

condition, welfare or quality of life, shall be protected appropriately.”

7.2. Relative agencies and institution

The main ministry in charge of environmental issues is the Ministry of Natural Resources and Environment (MoNRE). The MoNRE works for creating the national environmental policies, regulations and standards, monitoring pollutions including water, air, waste, noise and vibration, soil etc., and enhancing motivation among people to protect the environment. Other government entities include the Ministry of Industry (MOI), Ministry of Interior, Ministry of Agriculture and Cooperatives, Ministry of Transport and Communications, Industrial Estate Authority of Thailand (IEAT), and Electricity Generating Authority of Thailand. Fig. 7-1 indicates the organization chart of the MoNRE.

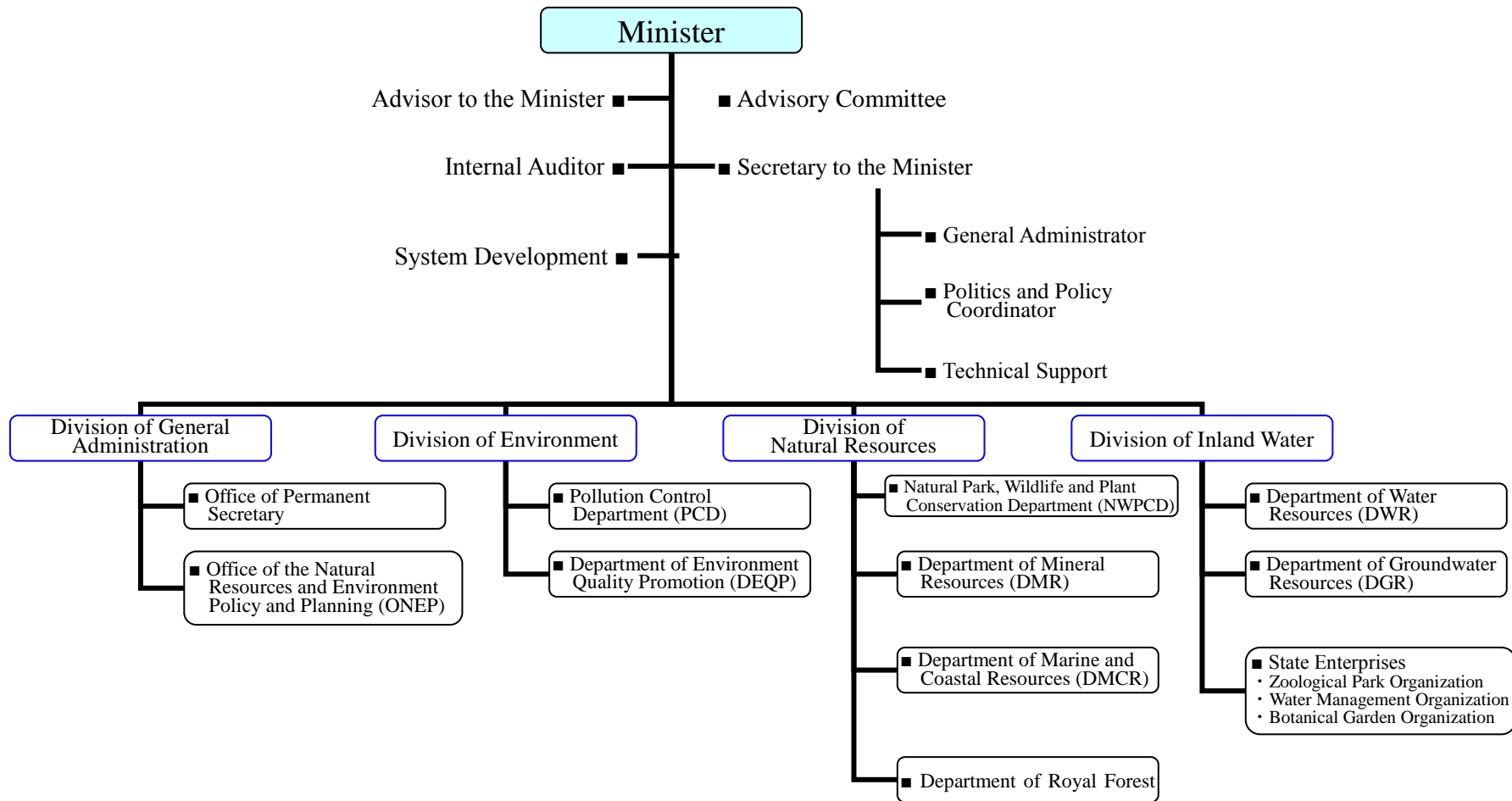


Fig. 7-1 Organization Chart of the Ministry of Natural Resources and Environment (MoNRE)

8. Provisional Scoping (types and magnitudes of possible adverse impacts and mitigation measures)

8.1. Types and magnitudes of possible impacts

	Potential Impact	Rating		Brief description
		Pre-Construction / Construction Stage	Operation Stage	
Pollution				
1	Air pollution	C	D	Dust and gas emission might be caused from heavy machinery and vehicles during construction works.
2	Water pollution	B-	D	In rehabilitating irrigation facilities, channel excavation or embankment reinforcement works may cause deterioration of water quality.
3	Soil contamination	C	D	Soil contamination might be caused by increased use of fertilizers for pasture reproduction.
4	Waste	B-	D	Increase of construction and domestic waste might be caused by construction works and inflow of workers.
5	Noise and vibrations	B-	D	Noise and vibration may be caused by construction works.
6	Ground subsidence	D	C	Upgrade of groundwater irrigation schemes, if any, might result in ground subsidence in the long run.
7	Offensive Odors	D	D	There are no activities that may result in the generation of significant offensive odor.
Natural Environment				
8	Geographical features	C	C	If proposed flood-damage mitigation measures involve construction of physical infrastructures, its possible impact on geographical features should carefully be examined.
9	Biota and ecosystems	C	C	If proposed flood damage mitigation measures involve construction of physical infrastructures, its possible impact on ecosystems should carefully be examined.
10	Water usage	B-	B+	Although available irrigation water discharge might temporarily be reduced during construction, water availability would be ensured by rehabilitation works.
Social Environment				
11	Involuntary resettlement	C	D	Rehabilitation works of existing irrigation schemes would require no involuntary resettlement. If proposed flood damage mitigation measures involve construction of physical infrastructures, however, a limited

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	Potential Impact	Rating		Brief description
		Pre-Construction / Construction Stage	Operation Stage	
				scale of land acquisition and involuntary resettlement might be required.
12	Local economies, such as employment, livelihood, etc.	B+	B+	Restored pasture, reinforced irrigation schemes and implementation of flood damage mitigation measures would be beneficial to rural livelihoods. Construction work might provide employment opportunity to local people.
13	Land use and utilization of local resource	C	D	If proposed flood damage mitigation measures involve construction of physical infrastructures, a limited scale of land acquisition might be required.
14	Existing social infrastructure and services	D	D	No significant impact is anticipated.
15	Social capital and regional decision making organization	B+	B+	Flood damage mitigation measures might include some communal activities to strengthen social safety net of the target communities.
16	Poor, indigenous or ethnic people	B+	B+	Restored pasture, reinforced irrigation schemes and implementation of flood damage mitigation measures would be beneficial to the poor suffering from flood damage.
17	Misdistribution of benefits and damages	C	D	Fertilizer distribution and selection of model sites should be conducted in a transparent manner to ensure equality among beneficiaries.
18	Local conflict of interest	C	C	In conducting fertilizer distribution, irrigation scheme rehabilitation and selection of model sites, attention should be paid to possible local conflict of interest.
19	Gender	C	D	Fertilizer distribution and selection of model sites should carefully be conducted to ensure gender equality among beneficiaries.
Others				
20	Traffic accident	B-	D	There are risks of accidents during construction.

Note:

A+/-: Significant positive/negative impact is expected.

B+/-: Positive/negative impact is expected to some extent.

C: Extent of impact is unknown.

D: No impact is expected.

8.2 Mitigation measures

Detailed mitigation plans will be elaborated through the implementation of the Project.

9. Alternatives to the project activities including 'without project' option.

As for component 1, it would be financially difficult for some livestock farmers to keep their animals if the project would not commence. Continuous purchase of feeds is heavy burden especially for poor farmers. Disposal of livestock would cause farmers to lose their future income source as well as dairy nutrition source.

As for component 2, the project would support Thailand's continuous effort to upgrade its irrigation facilities. In Thailand, especially in flat plain area, irrigation system is based on complex network controlled by irrigation facilities. Reinforcement of irrigation facilities would increase not only resilience against flood risks but also efficiency of water management, which could maximize the number of beneficiaries from the irrigated water.

As for component 3, the project would contribute to minimized flood damages and losses. In Thailand, farmland has to accept some amount of inundated water in case big food happens since current drainage system in Chao Phraya River cannot drain enough water when much water comes from upper stream. The project would select and implement flood damage mitigation measures while requesting farmers' active participation. When the project decides the measures, environmental impacts would be duly considered.

10. Result of the consultation with recipient government on environmental and social consideration including roles and responsibilities.

MOAC agreed with JICA on January 23, 2012 to abide by "JICA Guidelines for Environmental and Social Considerations (April, 2010)" in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

11. Terms of Reference for Environmental and Social Considerations

In Thailand, a project listed on the EIA must conduct an EIA prior to the project inauguration and be approved by the committee. However, the project are not required the EIA process as shown in Table 7-1, and are just enough for the instant surveys because the works are categorized as small-scale. However, in order to satisfy the compliance policy of JICA, conducting an Initial Environmental Evaluation - IEE is considered to be suitable to confirm the environmental and social impacts by the project works in accordance with JICA Guidelines for Environment and Social Considerations.

12. Other relevant information

None.