

Royal Government of Thailand

United Nations Development Programme

Ministry of Natural Resources and Environment

## **Sustainable Development Application and Green Indicators**

### Brief Description

This project develops evidence-based, sustainable development indicators, i.e. impacts of development on water quality, and livelihood in the *Thachin* River Basin in Central Thailand. With these indicators, it aims at monitoring the environmental situations in the river basin, and verifying the applicability of sustainable development initiatives relating to various systems of the environment and economic sectors including water, land, energy, agriculture, industry, and services. These indicators will be presented as a proof of applicability of sustainable development as good practices that lead to the sustainability of the environment and improved livelihoods so that governments, private sectors, farmers, consumers and communities are convinced and increasingly adopt these practices in their every day activities.

The project will be implemented under the direct execution (DEX) modality through the Regional Environmental Office 5, Office of the Permanent Secretary, Ministry of Natural Resources and Environment with the support from UNDP Thailand.

## SECTION I

### PART I. SITUATION ANALYSIS

#### 1. The River Basin and the Impacts of Development

*Thachin* River, along with *Meklong* River, diverges from the *Chao Phraya* River in Chinat Province, flowing 325 km southward passing through Suphan Buri and Nakhon Pathom Provinces, and releases into the South China Sea in Samut Sakhon. Its watershed forms a river basin in the central plain of Thailand extending about 10,868 sq.km. The upper and the middle parts of the river basin cover the provinces of Chinat and Suphan Buri whose land-use is predominantly agriculture. In the lower part, Nakhon Pathom economy is based on a mix of agriculture and industry with a significant service sector. Samut Sakhon, on the other hand, thrives largely on industry, which is a major source of pollution in the river.

The region has a combined population of 2.5 million with a lower density on the upper part and higher in the lower part, i.e. 528 persons per sq. km. in Samut Sakhon and 382 people per sq. km. in Nakhon Pathom. Its economy produces a combined gross provincial product (GPP) of 433,306 mil. THB or about US\$ 11,167.68 mil. in 2005.

Human settlements in the river basin distribute in agricultural and urban communities, which are administratively organized in 48 large and small municipalities. Out of these, 15 municipalities situate right on the Thachin riverbank, and discharge wastewater directly into the Thachin River and linked canals. Only 4 municipalities have wastewater treatment infrastructure.

**Table 1: Gross Provincial Products (GPP) of the region**

Provinces	Agriculture (mil. THB)	Manufacturing (mil. THB)	Others* (mil. THB)	GPP (mil. THB)	Per Capita GPP (THB)
Chainat	5,861	1,081	8,626	20,865	58,027
Suphan Buri	13,685	4,747	17,875	46,654	55,836
Nakhon Pathom	12,110	67,000	22,380	119,690	126,510
Samut Sakhon	12,817	201,790	13,530	246,097	482,544
	<b>44,473</b>	<b>274,618</b>	<b>62,411</b>	<b>433,306</b>	

\* Others include wholesale and retail trade and repair, hotel and restaurant, transport and communications, education, health and social work, community, social and personal services.

Source: NESDB, 2006

#### 2. Impacts on the Environment

As results of rapid industrial and agricultural growth in the region over the past several decades, Thachin River has become one of the most polluted rivers in the country. Water quality rapidly deteriorated to the point of a crisis in 2000, which endangered aquatic species and the livelihoods of communities living along the riverside. The concentration of biodegradable organic matter (BOD) was high in the Thachin River especially in the lower part, at one point for example, was 3.5 mg/l, which is higher than the 1mg/l standard for clean water, while the dissolved oxygen (DO) was 0.3 mg/l which was below the levels necessary to support aquatic life. Water quality monitoring by Environment Office Region 5 indicated that agriculture, industries and communities were 3 major sources of pollutants in the Thachin River.

Agriculture, which is most intensive in terms of land-use and capital inputs, accounted for 37% of pollutants, 23% of which released from 600 large and small swine farms. Chemicals, fertilizers and pesticides, are widely used to push for high yields in paddy fields and fruit orchards. About 123,127 acres of aquaculture, i.e. shrimp farming, largely in Suphan Buri and Nakhon Pathom, were also important sources of pollution.

**Table 2: Sources of Pollution in the Thachin River**

	<b>Sources</b>	<b>% Share</b>
1	Agriculture <ul style="list-style-type: none"><li>• Swine farms 23%</li><li>• Shrimp farms, paddy and orchards 14%</li></ul>	37
2.	Industry <ul style="list-style-type: none"><li>• More than 3,500 factories in textile, chemicals, food processing industries</li><li>• 1,147 factories released untreated waste water directly and indirectly into the Thachin River and the linked canals</li></ul>	33
3.	Communities (48 municipalities) <ul style="list-style-type: none"><li>• 15 municipalities situate directly on the river bank</li><li>• 4 municipalities have waste water treatment systems</li></ul>	30

Source: Environment Office Region 5, 2006

Industry contributes 33% of the pollution, distributed in more than 3,500 small and medium factories of textile, chemical, food processing. The sector accounted for about 6 times as much as agriculture in terms of GPP, however much polluted. The majority of these factories do not have a wastewater treatment system. According to REO 5, about 1,147 factories were likely to release untreated wastewater directly into the Thachin River. These are the major challenge for the Pollution Control Department, which has recently initiated a **cleaner technology programme** among these industries.

Communities with high density of settlements along the river, clustered in 48 urban small and medium municipalities. Only 4 of them have functional community wastewater treatment systems. The rest releases untreated waste water into the Thachin River.

The water quality crisis in 2003 has prompted varied degrees of responses from the government and communities. Since then **water quality** has become the **central indicator** for the environment of the Thachin River Basin.

## PART II. STRATEGY

### 2. 1 Sustainable Development Indicators

Water quality crisis in the Thachin River was a symptom of the imbalance of the overall development path in the region. It calls for a cleaner and healthier development. Urgent remedial actions are needed. More important, however, is a long-term strategy for addressing the problem. On the other hand, the crisis opened up a “window of opportunity” for sustainable development.

The Government of Thailand is committed to sustainable development following *Rio Declaration* in 1992, and reaffirmed through the *WSSD 2002 Plan of Implementation*. In 2005 the National Economic and Social Development Board (NESDB), in collaboration with UNDP-Thailand, has worked out sustainable development strategies for Thailand, synthesized in the concept of *green GDP*. For a country's development to be sustainable, the measurement of its GDP must take into account of a calculation of the environmental costs. In order to minimize the heavy costs incurred on the environment, a number of strategies were proposed. These include the strategies of green energy, green services, clean technology, organic agriculture, and green government procurement. “Green” refers to being clean and environmentally friendly.

These strategies were reported to the National Economic and Social Development Board in 2005. Consequently, following the Board's recommendation these sustainable development strategies have been integrated into the 10<sup>th</sup> National Economic and Social Development Plan (2007-2011).

The 10<sup>th</sup> Plan adopted H.M. King Bhumibol's guidance on “sufficiency economy” as its underlying principles, meaning that all development strategies and actions will take into account the 3 principles of sufficiency economy. These are the principles of **moderation, rationality** and **immunity**. According to these principles, production and consumption shall be moderate and rational, taking into account the sufficiency, the balance between human needs and the sustainability of the environment. The principle of immunity advocates for self-reliance in development, which, in turn, leads to resilience to external shocks. For these principles to be effective, they must be supported by **knowledge** and **ethical values**.

As policy process unfolds, these development strategies and royal guidance will be translated into various ministerial action plans. Among them, the Ministry of Natural Resources and Environment (MONRE) has agreed to work with UNDP-Thailand to develop a set of evidence-based indicators that would be instrumental in verifying the applicability of these strategies within the development context of the Thachin River Basin. MONRE, through its 5<sup>th</sup> Regional Environment Office (REO 5) has kept an excellent database on environmental issues in the region. These data provides a solid basis on which evidence-based indicators for sustainable development linking to these strategies may be built. This set of evidence-based indicators comprise of:

#### **Impacts of sustainable development on water quality, and**

##### **a) Impacts of sustainable development on livelihoods.**

REO 5 has identified 3 areas of development activities that have strong impacts on water quality, i.e. sources of water pollution, and the communities' livelihoods. These are, as described in the previous part, agriculture, industries and communities. On the other hand, it has identified 5 development initiatives in the context of the Thachin River Basin, in which green indicators may be developed and applied to achieve improved water quality and sustainable livelihoods. These are as follow.

2.1.1 **Organic farming** has been identified as a method of green agriculture, where by the use of chemical inputs will be reduced or eliminated, where possible.

Farmers in Suphan Buri and Chinat Provinces who practice organic farming have shown that their farming practices have improved the quality of water and soil on the one hand, and stable, moderate income, reduction of production costs, and improved health, thus livelihoods on the other. The indicators are aimed to capture evidences of these improvements.

2.1.2 **Renewable energy** in the form of biogas, generated by swine farm wastewater treatment, is evidently an improvement in water quality as well as livelihoods. The gas obtained by covered lagoon, and other technologies such as up flow anaerobic sludge blanket (UASB), anaerobic fixed film reactor

(AFFR), is used as fuel for generating electricity for the farm and household power supply and cooking, thus reducing production costs and improving livelihoods. REO 5 has identified several swine farmers who successfully generate and use green energy. The practice has proven positive impacts both on water quality and farmers' livelihoods.

**2.1.3 Cleaner Technology (CT)** is a concept that encompasses the use of environment-friendly production process and technology, including the improvement of the existing ones. As industrial waste is one of the major sources of pollution, Pollution Control Department has initiated a **clean technology programme** for industries and communities in Nakhon Pathom and Samut Sakhon. 14 factories in textile and food industries and 3 communities have participated in the programme. Significant improvement in the quality of water in the lower Thachin River has been observed and recorded by PCD since 2004. Treated waste water has not only improved water quality of the lower Thachin River, but also has positive impacts on the health and the livelihoods of participating communities, and those around the factories.

**2.1.4 Green service:** Although the service sector contributes less to the region's GPP in terms of economic value, it is usually cleaner than manufacturing and agriculture. They can have a direct influence over communities' consumption attitudes and the environment. Clean restaurants and hotels, for example, are more appealing to customers. If wastewater from these services were well treated before releasing into the canals and Thachin River, surface water quality would significantly improve, thus the health and livelihoods of consumers and the communities. Hotel and restaurants are apt to take the lead in the service sector in contributing to sustainable development. Successful enterprises, which adopt environmentally friendly service provision, will be identified by REO 5 to verify the sector's positive role.

#### **2.1.5 Green procurement by government**

Through procurement government agencies can positively and concretely influence the provision of goods and services in the economy. Public spending and investments account for a significant proportion of the region's GPP through government procurement of manufactured goods and services. NESDB has suggested green procurement as one of the sustainable development strategies to be led by government agencies. MONRE has made it a ministerial policy, and through PCD, initiated a pilot project to encourage agencies within MONRE to procure stationery and consumable items, hotel and cleaning services based on well-developed guidelines for the preference for products and services that meet minimum environmental requirements. Four provincial and one regional environment offices in the region will take the lead to show that green procurement can really have impacts on water quality and livelihoods.

## **2.2 Targets set by REO 5**

Against the background of the above initiatives, REO 5 has set moderate, related targets to be achieved by its actions according to its 5-year work plan. These include:

- Improved water quality in the Thachin River and linked canals;
- Generation of renewable energy (biogas) from swine farm waste management, and used in the farms and households, thus reduced production costs and costs of living, while at the same time, reduced greenhouse gas (CH<sub>4</sub>) emission into the atmosphere;
- Reduction of chemicals used in agriculture, thus reduced health risks for farmers and consumers, i.e. food safety, and reduced pollution of ground water and soil.
- Application of cleaner technology among industries, and communities.
- Application of *sufficiency economy* principles for sustainable development and livelihoods among farmers and communities.

## **2.3 Development Objectives**

This project aims at enhancing the application of sustainable development strategies as adopted at WSSD 2002 by the Thai Government. Recommended by NESDB, it aims at verifying if these strategies result in the sustainability of the environment and sustainable livelihoods. The results will be presented as indicators of sustainable development. Backed up by evidences, they are meant to convince the public and policy makers that *sustainable development initiatives* are desirable, and that sustainability is achievable. In verifying these strategies, it also wants to convince the public that that *sufficient*

*economy* principles, as guided by HM the King of Thailand, are well applicable, and proved by these indicators.

Convinced by evidences and successful examples shown by this set of indicators, it is believed that government agencies, private sectors, farmers and local communities in the region will be motivated to actually make changes in their production and consumption of goods and services. Having gradually made necessary, and successful changes in a critical region, it is possible to motivate other regions in the country to take own initiatives. It is then possible for NESDB to realize a green GDP for Thailand.

Economic and social gains through market mechanisms e.g. improved income, reduced costs, and through the enhancement of social capital, including knowledge, culture, education and health, will lead to sustainable livelihoods.

The tapping and the utilization of biogas (CH<sub>4</sub>) in swine farms, which is otherwise released into the atmosphere, naturally reduces the greenhouse gas emission, thus contributes to the mitigation of climate change. Through green GDP, sustainable livelihoods, and voluntary reduction of GHG emission, Thailand will concretely honor its global commitment to sustainable environment and development.

## **2.4 Outcome**

Policy and line agencies relating to environment and development at regional and local levels increasingly adopt and apply sustainable development practices whose applicability has been verified by green indicators within the context of Thachin River Basin. Likewise local industries, farmers and communities are increasingly convinced, and are motivated to apply production and consumption models that lead to sustainable environment and improved livelihoods.

## **2.5 Immediate Objectives**

To develop a set of **evidence-based indicators** appropriate for monitoring and verifying sustainable development's applicability and practicability, convincing enough to influence development policy decisions of local and national governments, as well as to influence production and consumption decisions and patterns of farmers, industrial firms and communities in the Thachin River Basin.

These evidenced-based indicators include:

- 1) Impacts of sustainable development initiatives on **water quality**;
- 2) Impacts of sustainable development initiatives on **livelihoods**.

The indicators are not just only quantitative measurements of value in monetary terms as results, but will be also be demonstrable in the form actual, production and consumption good-practices. Creative evidences of water quality, for example, in the form of a regeneration of local aquatic resource diversity, be it fish, prawn or plant, and livelihoods will also serve as desirable, evidence-based indicators.

## **2.6 Outputs**

Output 1. A set of evidence-based green indicators. These include:

Output 1.1 Impacts of sustainable development practices in organic farming, renewable energy, clean technology, green services, and green procurement **on water quality**;

Output 1.2 Impacts of sustainable development practices **towards the livelihoods** of the producers and the communities, sustainable livelihoods being positive social-cultural dimensions including health, income, living standard, knowledge and learning opportunities, and collective spirits;

Output 2. Capacity outputs, include:

Output 2.1 The strengthening the capacities of government agencies, for examples REO 5, provincial environmental offices, and PCD in delivery of green, public services and ministerial key performance indicators (KPI); through project activities;

Output 2.2: Enhanced knowledge and skills in monitoring development with green indicators for communities and networks of Rak Thachin Civic Groups, swine farmers' cooperative, and small and medium, local entrepreneurs.

Output 3. Policy advocacy, i.e. evidence-based policy recommendations, budgetary incentives and technical support from relevant government agencies;

Output 4. Tool kits for sustainable development communications and knowledge sharing in the form of publication, posters /multimedia presentation in Thai and English. Targets for communication and knowledge sharing include stakeholders in the Thachin River Basin, government agencies, CBOs, farmers, enterprises and schools.

## **2.7 Inputs**

(See a separate Excel file attached, filename: SD Application and Green Indicators -Section III Workplan&Budget.xls)

## **2.8 Activities**

Project activities are organized in 4 major sets of action, grouped by their purposes.

### **Activity 1. Developing evidence-based indicators**

#### Purpose:

- To gather evidences of impacts of sustainable development from those initiatives identified by REO 5. These impacts will be compared to baseline data collected by REO 5 and PCD.
- Conclusions will be drawn to establish the measurements of indicators.

#### Process: The process includes:

- a. A survey on impacts of sustainable development initiatives on water quality and the livelihoods as compared to baseline data. The kind of initiatives to be surveyed are:
  - i. Organic agriculture,
  - ii. Renewable energy
  - iii. Clean technology,
  - iv. Green services,
  - v. Government procurement.
- b. The results of the surveys will be assessed/ evaluated by methods appropriate for each individual survey. A small discussion workshop may be employed for in-depth comparative analysis of the survey results.
- c. Conclusions will then be drawn from the evidence gathered and the accompany analysis

### **Activity 2. Capacity building**

#### Purpose:

- Assuming we have obtained a set of indicators described in activity 1, the purpose is to identify/ assess needs of local governments, regional and provincial environmental offices, and civic organizations to which the project activities will help strengthen the capacities for monitoring the impact of development by evidence-based indicators.
- Policy advocacy will also be drawn from the process of capacity building.

#### Process: The process and participants include:

- a. Needs assessment: Stakeholders' capacity needs and motivations for using these indicators in monitoring water quality will be assessed. A dialogue workshop will be held in order to allow the stakeholders to identify their needs, and service support form the central government.
- b. Policy recommendations: In addition to facilitating the dialogue, the project team will assess/ analyze these needs and thereby formulate policy recommendations and communicate them to the relevant, central government authorities.
- c. Training: Results of capacity need assessment will be translated in to training workshops including:
  - i. Training workshop on green procurement for regional and local government agencies, schools and civic organizations.
  - ii. Training workshop on green services for hotel and restaurant industry.
  - iii. Training/demonstration on swine farm waste management and appropriate, biogas generation technology for swine farmers, and farmers' cooperatives.

### **Activity 3. Policy-related activities**

#### Purpose:

- Assuming that we have developed evidenced-based green indicators in activity 1, activity 3 aims at communicating the evidences and their proof to decision-makers in governmental agencies, corporate sectors and civil society at large.

#### Process:

- a. Policy dialogue on sustainable development application and green indicators for regional and local government agencies, schools and civic organizations.
- b. Exposure tour for policy officials and key stakeholders to observe sustainable development initiatives

### **Activity 4. Social marketing of project outputs**

#### Purpose:

- To promote sustainable development initiatives' applicability by means of evidence-based indicators among the Thachin stakeholders, aiming at motivating behaviour change to sustainable development practices.
- To publicize the empirical proof of the impacts of sustainable development initiatives on water quality and livelihoods.

#### Process: The process includes:

- a. Documenting sustainable development initiatives and their impacts on water quality and the livelihoods, following the evidence-based indicators in appropriate media e.g. popular publication, posters exhibition. The publications/ exhibition will be distributed to broader target groups.
- b. A knowledge marketplace will be organized locally to provide a forum for stakeholders and the public, as well as government agencies to learn from a share with each other on the sustainable development practices and their indicators.
- c. Other public relations and development communications activities such as dissemination of knowledge and evidence-based indicators through print and electronic media.

## **PART III. MANAGEMENT ARRANGEMENT**

The project will be executed through the UNDP Direct Execution Modality. The project organization consists of the following elements.

### **a) Project Board**

The Project Board's main responsibility is to guide and make executive management decisions to ensure the project merits, including approval of project revision. The Board consists of 3 roles: an Executive to chair the Board, a Senior Supplier to provide advices and technical inputs, and the delivery of the project outputs; and a Senior Beneficiary to ensure that the project benefits from the prospective project beneficiaries and *vice versa*. The chairperson of the Board, which will be the director of REO 5, who will liaise directly with MONRE Deputy Permanent Secretary, would hold the Executive role. The Senior Supplier's role would be held by UNDP. The Senior Beneficiary's role would be played by one or more of the representatives of key Thachin stakeholders and NESDB as the central government's policy-making agency. The organization of the project management structure is shown in the diagram below.

### **b) Project Assurance**

UNDP will take the responsibility of ensuring the overall performance of the project planning and management, and also carry out activities such as delivery of project inputs and conversion of project outputs through effective process management, and efficient use of UNDP TRAC funds.

### c) **Project Manager**

The project manager will be responsible for carrying out the project activities, and facilitate the processes necessary for the delivery of project outputs as designed by this project document, and per advised by the Project Board. The manager will be recruited by UNDP, with consultation with the Project Executive. The project manager will lead and supervise the field operation team and project assistant.

### d) **Field Operation Team**

In principle, REO 5 personnel will carry out field activities. However, REO would need assistance in terms of technical and communication expertise to form a field operation team. The team will therefore consist of a technical expert and a communication official whose main responsibilities are to carry out the project activities on sites. As there are 4 major activities, the operation team will have to regroup according to tasks required by these activities. Together with, and under the supervision of the project manager, the team will be reorganized into 4 sub-teams, i.e. 1) evidenced-based indicator sub-team, 2) policy advocacy sub-team, 3) social marketing sub-team, and 4) capacity building sub-team.

e) **Project Assistant** is responsible for assisting the project manager and the operation team in project administration, including financial documentation. REO 5 will provide this assistant.

Practically the project implementation team consists of 1 project manager, 1 short-term technical, and 1 communication experts, and 1 administrative assistant. REO 5 will provide office space and a project assistant, necessary facilities, communications.

The project implementation team will ensure the Project Board that the following responsibilities will be carefully and efficiently undertaken:

- The project achieves its objectives and delivers outputs as designed by this project document in efficient, and transparent manner.
- The project activities, work plan, progress and difficulties will be reported regularly, preferably quarterly, to UNDP, together with financial reports. A final report shall be submitted at the end of the project duration.
- The project implementation team will raise any issues within the project's boundary at any stage to the Project Board for advices and decisions, if a problem arises.

### f) **Risk Assessment**

#### 1) **Reshuffling of project leader**

With respect to frequent restructuring of MONRE's functional organization, there is a possibility of staff reshuffling. This may cause uncertainty. Such restructuring affects not so much policy on sustainable development, rather more on high-ranking personnel in the ministry. In the short and long term, the Thai government is likely to honour its global commitments to international concerns and agreements. Sustainable development is not tied to individual government and its officials. Although changes in the rank and file of government agencies is possible, it is unlikely that new appointees to policy positions at ministerial and regional offices would abandon efforts made in collaboration with United Nations agencies. In addition, this project's linkage to the principles of *sufficient economy*, guided by H.M. the King, which is dear to the Thai government and its development policies, adds indisputable value to this project. This practically reduces risk of failure, while increases the chance of receiving full support from policy decision makers

Considering the uncertainty of personnel reshuffling in the ministry, the project's design has taken this issue into account by designating the project leader at a middle level of the official hierarchy, at which the risk of abrupt change for this project is low.

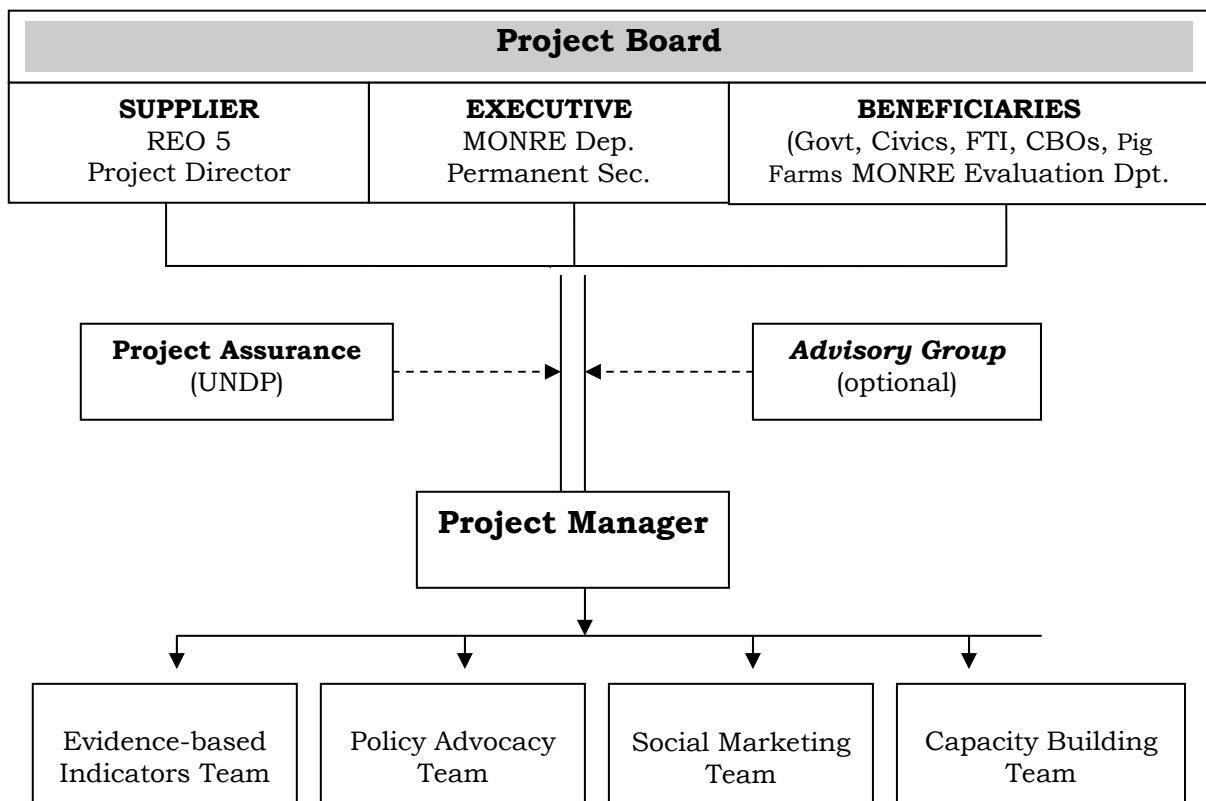
#### 2.) **Stakeholders' active engagement**

A preparatory groundwork has been well done by UNDP officials before they decided to develop this project document. The director of REO 5 has been very active and effective in applying integrated water resource management to improving the water quality in the Thachin River Basin. At the same time, REO 5 has established an extensive and strong network of local communities, civic groups and provincial administrations in the region. REO 5' s achievement in this respect is well recognized and

supported by policy officials of MONRE. The implementation of this project, with REO 5 as its Executive, can expect a full support from the Permanent Secretary of MONRE.

In the process of developing this project document, extensive consultation was conducted with REO 5 director and its officials, PCD's, Livestock Development Department's officials, several civic groups in the region, community leaders and farmers. Besides taking into account their opinions, the general assessment of the capacities and willingness of these prospective stakeholders is highly positive, meaning most of them were receptive and enthusiastic for engaging in the project activities. They all have great interest in protecting the environment, especially the Thachin River and linked canals, and improving their livelihoods. The opportunities are great and challenging. The risk in this respect is low.

Fig. 1 **Project Management Organization**



#### **PART IV. MONITORING AND EVALUATION**

The project will be subject to review and reporting in accordance with UNDP policies and procedures for Direct Execution. These include:

- Quarterly progress reports on the activities and financial statements of expenditures;
- Final report on the project activities, accomplishments and lessons learned.

In addition to reporting procedures, occasional field visits by UNDP's programme manager, usually documented in "back to office report" and the like will help keep track of project's operation and problems, should difficulty arises.

Beside regular monitoring mechanisms, the regular project board meetings open access to project's accountability.

Project's evaluation is subject to UNDP's annual plan and procedures.

#### **PART V. LEGAL CONTEXT**

This project document shall be the instruments referred to in the UNDP-Thailand Environment Partnership Programme signed by the Government of Thailand and UNDP on 20<sup>th</sup> July 2005, which remains in effect and provides practical framework for the implementation of this project.

All signatories to the original project document must sign the budget revision when it involves a change in project objectives or outputs.

The following types of revisions may be made to this project document with the signature of the UNDP Resident Representative alone may sign, provided that other signatories have no objections to the proposed changes.

- a) Revision in, or addition to, any of the annexes of this project document;
- b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangements of inputs agreed to or by cost increases due to inflation; and,
- c) Mandatory annual revisions, which rephrase the delivery of agreed project inputs or increased costs due to inflation or take into account agency expenditure flexibility.

**SECTION II  
RESULTS AND RESOURCE FRAMEWORK**

<b>Intended Outputs</b>	<b>Indicative Activities</b>	<b>Deliverables</b>	<b>Responsible</b>	<b>Timeframe</b>	<b>Resources</b>
<p><u>Output 1.</u> A set of evidence-based green indicators. These include:</p> <p><u>Output 1.1</u> Survey results on impacts of sustainable development initiatives in organic farming, renewable energy, clean technology, green services, and green procurement on water quality</p> <p><u>Output 1.2</u> Survey results on impacts of sustainable development practices towards the livelihoods of the producers and the communities</p>	<p><u>Activity 1.</u> Developing evidence-based indicators in 5 areas of practices:</p> <ol style="list-style-type: none"> <li>a. Organic agriculture</li> <li>b. Renewable energy</li> <li>c. Clean technology</li> <li>d. Green services</li> <li>e. Government procurement</li> </ol> <p>1.1 A survey of impacts of sustainable development initiatives on the water quality and livelihoods</p> <p>1.2 Evaluation of survey results and make a comparison with baseline data</p> <p>1.3 Drawing conclusions and documentation of evidences and indicators</p>	<ol style="list-style-type: none"> <li>1. Results of surveys in 5 initiatives</li> <li>2. Documented evidences of impacts of 5 initiatives on water quality and livelihoods, plus their verification</li> <li>3 Analyses and comparisons of results with baseline data</li> <li>4. Green indicators</li> </ol>	Project Team	6 months (Q 1&2)	45,000 USD
<p><u>Output 2.</u> Capacity outputs, include:</p> <p><u>Output 2.1</u> Enhanced capacities of government agencies, for examples REO 5, provincial environmental offices, and PCD in delivery of green public services and ministerial key performance indicators (KPI)</p> <p><u>Output 2.2:</u> Enhanced knowledge and skills on monitoring development</p>	<p><u>Activity 2.</u> Capacity building</p> <p>2.1 Capacity needs assessment, targets: government agencies, civic groups, farmers, industrial firms, CBOs and community leaders</p> <p>2.2 Training on green procurement for regional and local government agencies, schools and civic organizations.</p> <p>2.3 Training on green services for</p>	<ol style="list-style-type: none"> <li>1. Identification of capacity needs of key stakeholders, and service support from the central government</li> <li>2. Enhanced knowledge and skills of key stakeholders in using green indicators for monitoring water quality and other development practices.</li> </ol>	Project Team	3 months (Q 3)	41,250 USD

with green indicators for communities and networks of Rak Thachin civic groups, swine farmers' cooperative, and small and medium, local entrepreneurs.	hotel and restaurant industry. 2.4 Training/ demonstration on swine farm waste management and biogas generation technology for swine farmers, and farmers' cooperatives.				
<u>Output 3.</u> Policy advocacy	<u>Activity 3:</u> Policy-related activities  3.1 Policy dialogue on sustainable development application and green indicators for regional and local government agencies, schools and civic organizations.  3.2 Exposure trip for policy officials and key stakeholders to observe sustainable development initiatives	1. Policy relevant, lessons learned on green indicators, and recommendations  2. Demonstration/ empirical proof of green indicators	Project Team	1 months (Q4)	20,750 USD
<u>Output 4.</u> Tool kits for sustainable development communications and knowledge sharing	<u>Activity 4:</u> Social marketing of project outputs 4.1 Documenting the evidences of sustainable development indicators in the form print media and photo/poster exhibition  4.2 Organizing a knowledge marketplace  4.3 Public relations/ media actions	1. Tool kit publication, photo/poster exhibition on evidence-based, green indicators for dissemination.  2. A knowledge network on sustainable development indicators and good practices in all 5 selected development initiatives  3. Project publicity	Project Team	2 months (Q 4)	33,000 USD
TOTAL RESOURCE REQUIRED			140,000 USD		

### SECTION III. THE TOTAL WORK PLAN AND BUDGET

**Project Number:**

**Project Title: Application of Sustainable Development and Green Indicators**

Output	Indicative Activities	Deliverables	Timeframe				Planned Budget			
			Q1	Q2	Q3	Q4	Acc Code	Budget Description	Amount	total
Output 1	<u>Activity 1.</u> Developing evidence-based indicators in 5 initiatives: i. Organic agriculture ii. Renewable energy iii. Clean technology iv. Green services v. Government procurement Activity 1.1 A survey on impacts of sustainable development initiatives on the water quality and livelihoods. Activity 1.2 Evaluation of survey results and make comparisons to baseline data Activity 1.3 Drawing conclusions and documentation of evidences and indicators	1. Results of surveys in 5 initiatives  2. Documented evidences of impacts of 5 initiatives on water quality and livelihoods, plus there verification  3 Analyses and comparisons of results against baseline data  4. Green indicators	X	X						
							71300	Local consultant	29,700	
							71600	Travel	2,300	
							72100	Contractual services	8,800	
							72100	Contractual services	3,700	
							74500	Miscellaneous operating exp.	500	
								<b>Subtotal 1</b>		45,000
Output 2	<u>Activity 2.</u> Capacity building Activity 2.1 Capacity needs assessment  Activity 2.2 Training on green procurement Activity 2.3 Training on green	1. Identification of capacity needs of key stakeholders, and service support from the central government			X		71300	Local consultant	9,900	
							71600	Travel	1,750	
							72100	Contractual services	29,100	
							74500	Miscellaneous operating ex	500	
								<b>Subtotal 2</b>		41,250

	services Activity 2.4 Training/ demonstration on swine farm waste management and biogas generation technology	2. Enhanced knowledge and skills of key stakeholders in using green indicators for monitoring water quality and other development practices.							
Output 3	<u>Activity 3:</u> Policy Advocacy  3.1 Policy dialogue workshop  3.2 Exposure trip for policy officials and key stakeholders to observe sustainable development initiatives	1. Policy relevant, lessons learned on green indicators, and recommendations  2. Demonstration/ empirical proof of green indicators			X	71300	Local consultant	4,950	
						71600	Travel	1,500	
						72100	Contractual services	13,800	
						74500	Miscellaneous operating expense	500	
							<b>Subtotal 3</b>		20,750
Output 4	<u>Activity 4:</u> Social marketing of project outputs4.1 Documenting the evidences of sustainable development indicators in the form print media and photo/poster exhibition4.2 Organizing a knowledge marketplace4.3 Public relations/ media	1. Tool kit publication, photo/poster exhibition on evidence-based, green indicators 2. A knowledge network on sustainable development indicators and good practices in 5 development initiatives3. Publicity			X	71300	Local consultant	10,000	
						71600	Travel	1,500	
						72100	Contractual services	21,000	
						74500	Miscellaneous operating expense	500	
							<b>Subtotal 4</b>		33,000
<b>TOTAL</b>								<b>140,000</b>	

**ANNEX 1: List of Stakeholders and Potential Roles**

ID	Organization/ Groups	Potential Roles
1	Ministry of Natural Resources and Environment (MONRE)	Major beneficiary on behalf of the Government of Thailand
2	Regional Environmental Office, Region 5 (REO 5)	Lead this project's implementation, maintains environmental baseline data
3	Provincial Environmental Offices of Chainat, Suphan Buri, Nakhon Pathom and Samut Sakhon	Beneficiaries, to participate in green procurement survey
4		
5	Provincial Governors of Chainat, Suphan Buri, Nakhon Pathom and Samut Sakhon	Beneficiaries, representing regional administration
5	Pollution Control Department (PCD)	Initiate the clean technology programme, and lead the green procurement campaign among government agencies
6	Department of Livestock Development and its provincial offices in Nakhon Pathom and Suphan Buri	To participate in the survey of impacts of sustainable development (SD) on swine farming
7	Rak Thachin Civic Groups of Chainat, Suphan Buri, Nakhon Pathom and Samut Sakhon	Participating in the survey of impacts of SD on water quality and livelihoods, and taking part in the social marketing of project outputs
8	Industrial factories and business owners	Beneficiary, to participate in Clean Technology Programme by PCD
9	Swine Farmers' Cooperative of Nakhon Pathom	Beneficiary, to participate in the survey of the impacts of SD on swine farming
10	Hotels and Restaurants	Beneficiary, to participate in the survey of impacts of SD on the service sector
11	Schools (Donwai in Nakhon Pathom and Danchang in Suphan Buri)	Beneficiary, to participate in the survey of the impacts of SD on education and social development
12	Civil Society Development Group in Suphan Buri	Beneficiary, to participate in the survey of the impacts of SD on environment and livelihoods
13	Rural Reconstruction Foundation (an NGO in Chainat)	Beneficiary, to participate in the survey of the impacts of SD on environment and livelihoods
14	Health Promotion Office, (government funded agencies which supports health promotion programme, and health networks in rural areas)	Beneficiary, to participate in the survey of the impacts of SD on health and livelihoods
15	Individual organic farmers and farmers' groups	Beneficiary, to participate in the survey of impacts of SD on agriculture, and water quality
16	Individual and networks of communities in all 4 provinces	Beneficiary, and to participate in the survey of the impacts of SD on livelihoods

17	Faculty of Environment and natural Resources, Mahidol University	Source of technical support for project activities and the communities
18	Faculty of Agriculture, Kasetsart University at Kamphaeng Saen, Nakhon Pathom	Source of technical support for project activities and the communities

**Annex 2 Map of Tha Chin River Basin**

