Technical Assistance Report: PDA Mid-term Progress Report

Project Number: TA 6325 – REG: Promoting Water Policies and Practices (Phase 5)
PDA Start Date: 12 November 2007

Pilot and Demonstration Activity (PDA): "Producing Water Filter from Coconut and Oil Palm Shells"

03 March 2008

Asian Development Bank

Project Team Members

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TABLE OF CONTENTS

LIST OF APPENDICES

1. INTRODUCTION

The Pilot and Demonstration Activity (PDA) seeks to determine the feasibility of producing low-cost water filters mainly from coconut (and alternatively from oil palm shells), and to define an appropriate public-private partnership business model.

The Letter of Agreement (LOA) between ADB and CEERD the Executing Agency (EA) was signed on ***November 12th, 2007*** and the activities planned for a 6 month period started with a field visit on ***November 14th, 2007*** with the objective of meeting the local coconut producers and the authorities from Tap Sakae District (Prachuab Khiri Khan Province). This field visit was then followed by several other visits with the objective of gathering more information and data on the local conditions for the Activated Carbon (AC) project to be set up in one of Thailand's biggest coconut production areas, as well as to identify and to start discussions with potential shareholders to be involved in the project when the construction and operation of the AC plant will hopefully start.

2. SCOPE OF WORK

The PDA targets a region that is one of the major producers of coconuts in Thailand and also one of the poorest. The Local Authorities of Tap Sakae have recognized the need to hasten socio-economic development of the Province, through an integrated cluster development of local industries, such as an AC processing factory and production of low cost water filters for the domestic and international markets.

The pre-feasibility study will combine field activities and desk work and will look at following aspects:

- Stakeholders:
    - Meeting with local producers and cooperatives
    - Meeting with local community and local administration
    - Meeting with coconut processing industries
- Institutional and Legal Framework:
    - Meetings with relevant authorities at the local and provincial level
- Potential resources (Feedstock and AC Markets):
    - Identification of feed stock potentials and quality requirements
    - Identification of potential AC markets
    - Assessment of quality requirements
    - Assessment of market for water and air filters
- Technology and Process:
    - Evaluation of the different technologies and processes
    - Finalization of conceptual design
    - Preparation of investment and operational budget
- Preliminary Environmental Impact Assessment
    - Emission potential evaluation
    - Pre-assessment of CDM potential
- Outline of Financing plan:
    - Economic analysis with sensitivity analysis
    - Identification of Financing sources and Project implementation plan

3. IMPLEMENTATION

A. Progress of Work

Introduction

Following the signature of the LoA between ADB and CEERD on ***November 12, 2007***, the EA initiated activities scheduled in the PDA work plan, on ***14 November 2007***, with an Inception (1st) Field visit to Thap Sakae District to meet with the local authorities and the community, followed by other visits on ***December 6th, 2007*** and later on ***February 5, 2008*** to meet with other stakeholders and potential shareholders. A map of the localization of Tap Sakae is given in ***Appendix 1***.

Stakeholders:

Since the inception of the project, the EA wanted to create a strong link between the project team and all the stakeholders involved, and/or to be involved in the future, with the development of an Activated Carbon (AC) facility in the Thap Sakae District, Prachuab Kirikan Province of Thailand. The EA then organized a series of three field trips to Thap Sakae to meet with all possible stakeholders.

The objectives of these field trips were:

- to get a clearer understanding of the local coconut industry: visiting the fields, the factories and collecting data from local or provincial authorities;
- to identify the stakeholders, by meeting the local growers and their associations, the processors of coconut and charcoal, the local (district and sub-district municipalities) and provincial authorities (mainly the agriculture administration);
- to explain the ins and outs of the project and to set up with the stakeholders the next steps of the project activities.
- To prepare a large public hearing to present the project to the district community at large, and to gather their sentiment and eventually their approbation for the project development.

From the first three field trips, the EA was able to identify the local coconut growers and processors of coconuts, grouped under several local Coconut Associations which will be the potential partners for setting up the projected AC plant.

On ***November 14th, 2007***, a mini-public hearing was held with the sub-district coconut growers and processors, and their participation and interventions showed that a large majority was enthusiastic to supporting the development of the AC plant. The community also requested that a brochure in Thai language describing the project and its outcomes and impacts be prepared by the project team and be distributed to the community at large before the organisation of the public hearing now scheduled to be implemented on ***March 26, 2008***.

From the official side, both municipality and agriculture representatives have been involved for some times in this project concept and they have already provided information and data about the coconut sector and they see in this project a good chance to improve the socio-economic situation of the province, by creating jobs, improving incomes of families, etc..., as well as the potential for developing in more efficient way the local coconuts processing industries (coconuts and charcoal production particularly).

It is in the intention of the project initiators and promoters to create a small training center associated with the AC plant to help local farmers and coconuts growers and processors to improve their incomes through the creation of additional complementary cultures, improving the productivity and quality of the coconut production and also improving their coconut shell

charcoal production through better techniques and better management, as their actual procedures and techniques are technically unsophisticated and simplistic, leading often to losses of material and of quality when producing charcoal. The AC plant will have an analysis laboratory to analyse the quality of the feedstock received and of products all along the production chain. This will be of much help for the evaluation of the production of coconut and of charcoal of the district community and to help them in improving the quality of their products.

More visits to Tap Sakae District have been scheduled before the end of the project, but one will be of particular importance, and it is the large public hearing to be organized on the ***26 March, 2008***, at the Thap Sakae district community meeting place, with a large participation of the local population (more than 200 persons are expected). This meeting will have as main focus to present the project and to evaluate the way the community perceives this project and finally to know if they approve and support its development in their district.

On the request of the Community, the EA has prepared a brochure in Thai describing the project concept design and the project outcomes and impacts, which will be distributed to the Thap Sakae district community, two (2) weeks before the implementation of the public hearing scheduled to be held on ***March 26, 2008***. The invitation to the public hearing will be sent directly by the district chief to all members of the community (1,000 copies of the leaflet will be distributed at this occasion).

(See Project Brochure in ***Appendix 5*** and the Third (3rd) Field Trip Report in ***Appendix 12***)

Institutional and Legal framework:

The Ministry of Industry and its Department of Industrial Work, as well as the Office of the Board of Investment (BOI) will be the relevant institutions regarding the implementation of the AC manufacturing and possible production of water filters project.

Apart from the Ministry of Industry, a certain number of other line ministries should also be involved in the development of this project. They include: Ministry of Finance, Ministry of Commerce, Ministry of Interior, and Ministry of Energy.

During the 1st half of the project, the EA experts have gathered thorough information from all relevant institutional and legal entities in relation with the project and have prepared clear and detailed information concerning the administrative steps and legal aspects linked with the development of an activated carbon industry in Thailand.

The BOI has also been contacted and has given a promising answer concerning the potential granting of BOI privileges to the AC project. Of course, the final and formal decision can only be obtained when the project is set-up and a formal request is sent to the BOI.

(See BOI privileges in ***Appendix 6***)

Potential Resources (Feedstock & AC Market):

Potential resources in the case of production of activated carbon from coconut shells refer mainly to: (i) identification of feedstock (coconut shell) potential and of the quality required to produce activated carbon; (ii) identification of potential national and international activated carbon off-takers; and finally (iii) the quality requirement of the activated carbon products traded on the various markets.

- **Identification of Feedstock Potentials and Quality Requirements:**

  ✓ ***Feedstock Potential***

A substantial part of the land in Thap Sakae district is used for coconut plantations: around 80% of the cultivated area is covered with coconut trees (i.e. 136,788 rai ~ approximately 220 km^2). Figures provided for the district show an average number of 20 to 25 trees per rai with an average tree production of 5 to 10 nuts every 30 days. As a result the number of nuts is huge: 275,343,300 nuts per year, or 754,365 nuts per day.

At present, neither all coconuts are processed, nor are all parts of coconuts utilized. The actual process is done locally, by land owners with quite primitive techniques. Moreover, the installed capacity for coconut processing doesn't allow, at present, to treat all available coconuts.

The local coconut processing consists in:

- Coconuts cracked to open,
- Water collected and sold,
- Flesh removed and sold to be either used for coconut cream or coconut oil after drying,
- Pressed cake from the coconut oil production used as animal fodder,
- Coconut shells being processed for local charcoal production, later crushed to make charcoal briquettes,
- Fiber being compacted and baled, while the dust is disposed in most cases, posing a problem of bug contamination, waste management and fire risk.

The coconuts that are not processed locally are sold at low price and transported to the central part of Thailand for further processing. All this process has been carefully described in details and illustrated with photographs in the 1st field trip to Thap Sakae Minutes (14 November 2007) given with the project Inception Report.

The table below translates the production of coconuts into the volume of inner shell being available for feeding the charcoal manufacturing process. In addition to Prachuab Khiri Khan Province, the volume is also estimated for the neighboring southern Province: Chumporn.

ESTIMATED POTENTIAL OF RAW MATERIAL IN CHUMPORN & PRACHUAP KHIRI KHAN PROVINCES

PLANTATION AREA	Unit	Coconut trees area*	Whole nuts (Tons /Year) **	Raw Inner Shell Potential (Tons /Day) ***	
				min	max
Mueang Prachuap Khiri Khan	Rai	48,991	132,276	43	45
Kui Buri	Rai	12,219	32,991	11	11
Thap Sakae	**Rai**	**136,788**	**369,328**	**121**	**126**
Bang Saphan	Rai	152,621	412,077	135	141
Bang Saphan Noi	Rai	77,816	210,103	69	72
Pran Buri	Rai	4,616	12,463	4	4
Hua Hin	Rai	1,387	3,745	1	1
Sam Roi Yot	Rai	7,046	19,024	6	7
Prachuap Khiri Khan Total Area	Rai	**441,484**	**1,192,007**	**392**	**408**
Chumporn Total Area	Rai	**372,629**	**540,000**	**164**	**197**

* figures from the Office of Agricultural Economics, 2007 update
** estimated, according to the average of trees/rai, nuts/tree and nuts weight
** estimated, according to a min/max assumption for inner shell / whole nut

Sources: Office of Agricultural Economics, Questionnaire and own calculations

The project is considering an AC production of around 10 tons per day, meaning a volume of 100 to 150 tons of raw coconut shells processed per day (including shells for the production of

electricity for the process). This is on line with the output figures from the Province, before taking into account the present uses of the shell, mostly local charcoal manufacturing.

Chumporn Province, like most of the southern Provinces of Thailand, and Malaysia or Indonesia as well, presents consequent areas planted with Palm trees. It must be noted that shell from oil palm trees are also suitable for production of charcoal and eventually AC. However, the project has not yet found at this stage any analyses proving that oil palm shells activated carbon has the same capabilities as the activated carbon from coconut shells. However, the structure, consistency and chemical composition of oil palm shells are very close to that of coconut shells, which allow thinking that oil palm shell could be a good feedstock for production of high quality activated carbon. However, more analyses would need to be performed to demonstrate above hypothesis, and which cannot be implemented in the framework of this PDA for limitation of funds.

(See some Agricultural Coconut Statistics & Information in ***Appendix 7***)

✓ ***Feedstock Quality***

From the field visits implemented, samples of coconuts shells, charcoal and coco pith were collected in order to assess their chemical, physical and thermal characteristics and composition as they will be the raw materials to be used for AC production. The analyses performed on above coconuts residues show that the quality of the coconuts residues (shells & coco pith) available in the Thap Sakae District are of good quality and offers sufficient guarantees for their use as feedstock in the production of activated carbon. As regards the charcoal already produced in Thap Sakae district, analyses shows that there is a good margin for its quality improvement (probably through technological process and management improvements).

(See the main results of coconut analysis in ***Appendix 8a,*** as well as a comparative analysis of coconut shell and oil palm shell in ***Appendix 8b).***

- **Market Status and Identification of Potential AC Markets (National and International)**

It is forecasted that the world demand for virgin AC will expand an average of 5% annually through 2010 to 1.2 million metric tons. The most mature markets (North America, Western Europe and Japan) will continue to account for over half of demand in 2010, despite slower than average growth. Greater growth opportunities will generally occur in developing geographic markets, primarily the emerging industrial economies of Asia. China will increase its share of the global AC market to around 13 percent in 2010. Smaller markets, including Latin America, Eastern Europe and the Africa / Middle East region, will also record above average gains.

Production of AC varies significantly from region to region, with the Asia/Pacific region and North America accounting for the majority of overall production. This concentration of production is related to both the level of demand in these regions and the ready availability of low cost raw materials required to produce the AC. The former ensures a market for AC, while the latter allows for production at a competitive cost. The largest producers of AC in the world are China, the US and Japan -- with the Philippines, India, Sri Lanka and Thailand also important.

Overall, the Asia/Pacific region contains the highest production capacity for AC, at 770,000 metric tons in 2005. Unlike other regions, where a relatively small number of companies account for the majority of capacity, in this region there are an estimated 80 to 100 different manufacturers of AC. Plants also generally tend to be much smaller than in other regions, with

most having rated capacities of less than 10,000 metric tons per year?. The greatest concentration of these small producers occurs in China (40 to 50 producers) and in India (12 to 15 producers). (See some statistics on the AC National & International Markets are shown in ***Appendix 9***)

The following two Tables show the wide range of industries that could be targeted as future off-takers. It is important to note however that the main utilization of Activated Carbon is in the liquid phase and more precisely for water treatment purposes.

Liquid phase

Type of industry	Description of process	Application area
Potable, process, ground and waste water treatment	Adsorption of organic impurities	Chlorine and ozone destruction, removal of (excess) fertilizer
Goldmines	Recapture of gold from cyanide solution	Treatment of mine dumps
Electroplating	Metal coating by electrolyses	Acid purification, odour control
Alcohol	Taste and colour improvement	Production of wines and distillates
Caffeine removal	Extraction of caffeine	Production of tea and coffee
Petrochemical industry	Condensate treatment, oil removal	Feed water for (high pressure) boilers
Sugar/glucose	Colour and taste improvement	Beet and cane sugar, glucose

Note: Above list constitutes a general survey of applications and does not pretend to be exhaustive
Sources: DACCO B.V.

Gas phase

Type of industry	Description of process	Application area
Dry cleaning, fibers, degreasing of metals, coatings, printers, film/videotapes, peppermills	Removal of organic solvents from gas streams	perchloorethylene, methylene chloride, ethylacetate, toluene, benzene, etc.
CO_2-production Breweries	CO_2 purification	Removal of alcohols, amines and Mercaptans
Gasmasks	Adsorption of organic fumes, war gases	Industry, army
Cigarettes	Taste and flavour control	filter tips
Air-conditioning	Odour control, removal of corrosive gases	Airports, office buildings, museums, etc
Waste disposal	Odour control	Removal of Mercaptans, chlorated hydrocarbons
Catalyst	Use as catalyst or catalyst carrier	phosgene production, reaction processes
Natural gas	Purification, H_2S and/or Hg removal	MEROX treatment
Domestic use	Removal of aromatic components	Kitchen hoods, refrigerators, panel filters
Transportation of chemicals	Adsorption/desorption	Removal of toxic gases

Sources: DACCO B.V.

Identification of the national, regional and international players is currently under preparation.

- **AC Quality Requirements and Products**

The fact remains that for having a commercial use, AC must show regular characteristics. That is why the AC industry in collaboration with standard organizations have elaborated standard tests for evaluating physical and adsorptive characteristics of AC. The plant design will include a laboratory to analyze and control the quality of the input/output, especially needed if the activation process is tailored at times according to special customer requirements.

It must be reminded that a great range of AC is available on the markets worldwide, each one with different physical and activity properties: first, because of the raw material used for the production; second, of its form (granular, powdered or pelletized) and third, of specific activation characteristics making it suitable for a special use.

Moreover, AC prices may greatly vary according to the quality or characteristics, the manufacturing process, the grade but also the end use of the product. Granular or extruded AC tend however to be more expensive than powdered AC. (See AC Quality Requirements & Products in ***Appendix 10***)

Technology and Process:

There are two basic activation techniques used to produce AC:

- Chemical Activation where the raw material is impregnated with a strong dehydrating agent (usually zinc chloride, phosphoric acid or potassium hydroxide), and then heated to temperatures between 450 - 900°C.
- Physical Activation where the raw material is activated with steam under inert atmosphere at high temperatures between 900 – 1100°C, depending on the raw material used.

The industrial process for activating carbon can be done in two ways:

- The first option is to integrate carbonization and activation phases. In that case, raw coconut shell is used as raw material and the carbonization of the shell precede the second step – the activation phase. It is important to note that these two phases have to be done separately because charcoal material must be cooled after being carbonized, before it can be activated.
- The second option, commonly used by AC manufacturers worldwide, starts directly from the activation stage, using coconut shell charcoal as raw material. Charcoal preparation consists in crushing it as a fine powder with a rotary crushing equipment to feed the kiln.

AC produced by steam activation generally exhibit a fine pore structure, ideal for the adsorption of small molecular weight products and for applications involving low contaminant concentrations. Steam activation is generally used for coal-based, coconut shell and grain based activated carbons. The AC plant will use steam activation, fitting perfectly with the needed output and avoiding any problem linked with environmental hazards from the use of poisonous chemicals.

After discussions with the Thap Sakae Stakeholders concerning the quantity of available coconut shells in the district and of the present quality of the coconut charcoal produced by the Thap Sakae district charcoal processors, the EA has arrived to the conclusion that the AC plant should produce it own charcoal from coconut shells to ensure the best production of AC, at levels of quality as required by the national and international market players.

The conceptual design of the plant has then been prepared and finalized, and the selection of the technologies to be used for the various plant processes is now under scrutiny. In particular, it is envisaged at this stage that the electricity could be generated using coconut shells or

charcoal through the use of an industrial gasifier. The production of steam needed in the activation process will most probably come from the recuperation of heat from the flue gases produced in the coconut charcoal production. The environment impacts of the plant will be reduced at the maximum through the recuperation and filtering of all emissions.

The EA is now evaluating the investment cost this plant, as well as its operational budget costs.

Appendix 11 presents the AC Technology Design Concept which comprises of several main units, such as:

- Stockages of coconut shells and coconut charcoal;
- Production of coconut shell charcoal (batch process);
- Activation of the coconut shell charcoal (continuous process);
- Preparation and conditioning of the activated carbon (packaging, filters, etc…);
- Stockage and dispatch of the final products;
- Utilities (electricity & steam production, water treatment, fire protection, etc…).

The detailed technical design of the plant would need to be prepared during the full feasibility phase of the project, if the present pre-feasibility study demonstrates that the project is economically and financially feasible, environmentally sound, well accepted by the community and present good prospects for replicability in other provinces of Thailand and/or in other Asian countries.

Preliminary Environmental Impact Assessment:

As at this stage of the preparation of the Interim report, the technology and processes are still under final identification, and it is not possible to start the environmental evaluation of the project and to estimate if there is the potential for a CDM development.

Outline of the Financing plan:

As soon as the capital cost and operative costs of the AC project will have been estimated, an economic and financial analysis of the project will be performed, to valuate the main characteristics of the project, such as Project Internal Rate of Return (IRR) and Project Net Present Value (NPV) of the project. Sensitivity analysis will also be implemented on the most sensitive parameters and variable of the project, and including: price of feedstock, price of AC in the national and international markets, fix and variable costs, etc… to determine their impacts on the project IRR and NPV.

Similarly, an initial simulation will also be performed on the financial characteristics of the loan taking into consideration the loan interest, duration of the loan, grace period, etc… Several financial indicators, such as the Financial IRR (FIRR) , Equity IRR (EIRR), Debt IRR (DIRR), as well as other financial indicator such as: LLCR and ADSCR will also be used to evaluate the feasibility of the project.

A financial scheme for the financing of the AC plant in Thap Sakae will also be proposed, as well as some indications on the potential financial institutions which could be involved in the project financing.

Finally, a road map will also be proposed for the continuation and development of this project, as well as on the potential replicability of this project in all the ASEAN region, including: Cambodia, Indonesia, Philippines, Vietnam and Thailand.

B. Cost and Financing

See ***Appendix 2***- *Cost Estimates and Financing Plan*

C. Implementation Schedule

See ***Appendix 3*** - *Project Schedule of Activities*

D. Implementation Management Arrangements

Since the start of the project, the Project Management Team has implemented several main activities, such as:

- **Setup of the Team of Experts:**

The following experts are at present part of the Team:

- Team leader: **LEFEVRE, Prof. Thierry**, Economic and Financial Expert & Project Coordinator / Planner
- Team member{s}:

  LE MARIER, Yves Henri, Technology Expert

  HERMAN, Wipapan, Community Coordinator and Interpreter

  LEFEVRE, Francois, Marketing Expert

Compared to the Team of Expert initially set-up and approved by ADB at the time of the Inception Report, and due to the departure of two experts, some modifications, which do no modify at all the overall quality of the Team, have been introduced in the composition of the Team of Experts. These changes concern mainly the position of the Environmental Expert and of the Assistant Community Expert. New experts have and will be selected to carry on with the following tasks:

Environmentalist (to be selected after the technical design is finalized)

The Assistant to the Community Expert will be brought as an in-kind contribution from the local administration (to help mainly with the implementation of the public hearing preparation and implementation) and will be as follows:

SURAPUN Tung Kao Tong, Assistant Chief Officer, Tap Sakae District Administration Office.

In addition, the Local Agricultural Expertise is also brought as an in-kind contribution from the Project's Community counterparts:

NGERNTHAENG, Chod, Mayor from Tap Sakae District

- **Organization of Field Trips and Community Meetings:**

Up to the time of the preparation of this Interim report, three (3) Field trips have been implemented to Thap Sakae to meet with the multiple project counterparts' parties of the project, as well as with the local community at following dates:

- **14 November 2007**
- **6 December 2007**
- **5 February 2008**

During the latest field trip, it was agreed with Thap Sakae authorities that a public hearing

will be organized at the district level on ***26 March 2008*** to allow the project team to present the project to the community at large, and to allow the community to show it opinion concerning the development of this project.

Appendix 3 shows the Project Schedule of Activities and ***Appendix 12*** – the third (3) Field Trip Report.

- **Implementation of the Main Project Activities:**

The project is going smoothly, as scheduled, and the various implemented and on-going activities are shown in attached Appendix 3 - Project Schedule of Activities).

In particular, since the start of the project, following activities have already been implemented and finalized:

- Stakeholders:
  - ✓ Meeting with local producers and cooperatives
  - ✓ Meeting with local community and local administration
  - ✓ Meeting with coconut processing industries
- Institutional and Legal Frameworks:
  - ✓ Meetings with relevant authorities at the local and provincial level and preparation of a report on institutional legal framework in Thailand.
- Potential Resources (Feedstock and .AC Markets):
  - ✓ Identification of feed stock potentials and quality
  - ✓ Identification of the potential AC market
  - ✓ Assessment of quality requirements
- Technology and Process:
  - ✓ Evaluation of the different technologies and processes
  - ✓ Finalization of conceptual design

The other activities which are now under implementation are shown herewith after:

- Stakeholders:
  - ✓ Preparation of a public hearing on ***26 March 2008***
- Potential Resources (Feedstock and .AC Markets):
  - ✓ Assessment of market for water and air filters
- Technology and Process:
  - ✓ Preparation of investment and operational budget
- Preliminary Environmental Impact Assessment:
  - ✓ Emission potential evaluation
  - ✓ Pre-assessment of CDM potential
- Outline of Financing Plan:
  - ✓ Economic analysis with sensitivity analysis
  - ✓ Identification of financing sources and project implementation plan

- **Establishing a Design and Monitoring Framework (DMF):**

The proposed Measurable Performance Indicators (MPI) and deliverables which have been selected in the framework of this PDA and their actual level of accomplishment is shown hereafter:

- Conceptual design – Finalized;
- Technical and financial pre-feasibility analysis - On-going;

- Market analysis and potential for activated carbon in Thailand and other ASEAN countries – Finalized;
- Identification of potential buyers of activated carbon in Thailand and overseas – On going;
- Identification of potential raw material suppliers in the Southern part of Thailand – On-going;
- Identification of coconut Industries in the areas around Tap Sakae that processes coconuts – Finalized;
- Identification of potential for production of water filters in Thailand – On-going;
- Identification of product quality requirements - Finalized;
- Upscaling potential of the project in other ASEAN countries – On-going.

(See the DMF Table in ***Appendix 4***).

- **Reporting of Project Activities** according to the following schedule:
  - Project Inception Report, has been submitted on: ***December 15, 2007*** (Inception Report approval was received on January 17,2008)
  - **Project Mid-term Report, being submitted on *March 03, 2008***;
  - Project Completion Report, to be submitted by ***May 05, 2008*** or earlier, if possible.

4. CONCLUSIONS

Three month after the start of the project, activities are well on track. Experts have been advancing in their respective fields of expertise and have been preparing the expected reports.

The Community and potential local Partners are also efficiently helping the project team and the EA in the implementation of the various activities, gathering of the necessary administrative and quantitative information and statistics need by the project, and in the preparation of the public hearing to be held in Thap Sakae District on ***26 March 2008***.

At this stage, it is expected that the project will go smoothly without major obstacles.