



Component Status Report
Introducing Eco-Efficiency in Industry

Programme Progress Review Mission

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1. Introduction of the Eco-Efficiency Component

The “Eco-Efficiency-Component” is targeting at the improvement of SMEs’ competitiveness by introducing eco-efficiency. In this sense eco-efficiency is being understood as an element of competitiveness. The final target groups are SMEs’ managers and entrepreneurs, who should apply eco-efficient measures. The component’s impacts are directed towards enterprises, which shall gain their competitiveness by resource- and environmentally oriented performance and responsible entrepreneurship, and at the same time towards environmental compatibility of industrial impacts.

Following the vision of sustainable development, eco-efficiency is contributing in particular to implementing the sustainability elements “economic development” and “ecological sustainability”. In the framework of the PEC, "eco-efficiency" is applied to the business-enabling environment, and refers to the whole value-chain. Its subsets are technical, economic, managerial, administrative, legal and awareness promotional. The component activities and interventions, as well as its projects are focusing on selected sectors of the business enabling environment and selected agro-business sub-sectors. The fields’ (sectors’) selection is in accordance with the special requests from the Thai counterparts, the eco-efficient impacts’ significance of those fields and the selection procedure for the determination of agro-business sub-sectors.

The component had been pre-shaped by the predecessor Thai-German projects in the field of eco-efficiency, in particular in the fields of eco-industrial estates, dangerous goods handling, environmental management systems and cleaner production. The component is in so far a logical development and bundling of the former cooperation projects. It is efficiently building on those project experiences and results, and at the same time increasing their sustainability.

In accordance to the aim of the Business and Financial Services (BFS) Component, the Eco-Efficiency Component aims at improving the eco-efficiency services for SMEs. The term services shall indicate the SME-targeted “Dienstleistung”, provided by organizations or institutions, be them public, governmental bodies or private enterprises, with the aim of increasing the sustainable competitiveness of SMEs.

The role of the public sector is crucial and impacts SMEs at the Programme goal level (SME competitiveness), as well as at the components’ level where the public sector has a vital role to create a supportive environment for the functioning of the eco-efficiency as well as business and financial services market.

Beside the impact on the immediate competitiveness of individual SMEs, the eco-efficiency component must also consider public interests in a safe and sound environment, and long-term perspectives of a general sustainable competitiveness. This leads to market-oriented incentive and disincentive schemes for SMEs, consumer advisory and awareness for a sustainable development.

For example, if the Ministry of Agriculture stops giving away Good Agricultural Practices (GAP) certification for free it will then stimulate the private sector to enter into this market. Or, establishing the correct feed-in tariff for biomass power producers will lead to private investments in biomass energy production, which will then create the right market conditions for eco-efficiency services, as well as will diminish water-pollution. Or, consumer advisory, certification and labeling shall stimulate the market for environmentally compatible products.

2. Component Management

2.1 Component Target

During the first two years of the Programme the main management targets of the component were the development of:

- Systems and Procedures
- Personnel
- Projects
- Interventions
- Partnerships with other German TC organizations

2.2 Systems and Procedures

2.2.1 Impact Assessment

The impact assessment system of the component comprehends two main areas: The goals and its indicators (a) on the Programme and Component level as determined for the AURA-Angebot and the further discussions with the BMZ and (b) on the project, result and intervention level as participatory determined in planning workshops with the project counterpart.

In the further planning process, the indicators have been adapted in such a way, that at least one SME competitiveness level (programme goal level) indicator and at least one component level indicator must be reached by each individual project.

In order to get a common understanding several workshops were held with the staff of both components to explain the system.

2.2.1 Sector Strategy Papers

A number of projects had been proposed to the Programme Task Force, even before the Programme started. They served for the AURA-Angebot's design, in particular for its eco-efficiency component. After a comprehensive selection process, the criteria of which referred to their contribution to the goals on programme and component level, to the significance of the field of action (sector) for the competitiveness of SMEs, and to the potential impact for the process of introducing eco-efficiency in industry. Finally three of the proposals could be developed towards comprehensive projects, the further planning and implementation of which immediately started with the beginning of the Programme. They cover the eco-efficiency fields of energy efficiency, chemicals risk management and environmental management information systems.

As a basis for determining focal areas for eco-efficiency-related interventions, the component had a research done on the eco-efficiency state-of-the-art and perspectives for a successful introduction of eco-efficiency to the Thai industry. It gave an impression about the institutional landscape of eco-efficiency, identified the specific barriers and driving forces affecting the up-take of eco-efficiency measures and led to the impact-potential of intervention areas on governmental and institutional level, on SMEs' level and on the level of consumers. The result has been presented and discussed on the first Eco-Efficiency Forum, which had jointly been organized with the MoNRE. The presentation and the further discussions stimulated the policy awareness of eco-efficiency as a factor of competitiveness, and as an issue, which needs inter-institutional and cross-ministerial cooperation.

As agro-business had been determined as the main sector for the beginning of the Programme, - coordinated mainly by the BFS-component - a lot of energy had been invested into the further selection process for agro-business sub-sectors. It started with about 60 possible agro-industry sub-sectors. Selection criteria were developed, studies conducted and partners consulted before the Programme produced a shortlist of approximately 14 sub-sectors. After further consultation with the Programme's partners, this list was narrowed down to 8. Following this, a series of more detailed sub-sector studies were completed for palm oil, shrimps, tangerine, longan, saa paper and vegetables.

Based on these studies and further investigations five strategy papers were prepared under the guidance of the BFS component.

The strategy papers outline: a) critical constraints and opportunities for the sectors, b) a vision of what could become of the sector and c) what “actionable” areas of interventions of the Programme are likely to yield the greatest impact on the sector’s competitiveness.

In addition to the basic documentation of the mentioned research, and the commodity sub-sector strategy papers, the component is focusing on strategic aspects of generic eco-efficiency services as part of the “business-enabling environment”. Strategy-oriented consultations on energy-efficiency, environmental information systems, consumer protection and advisory, and the promotion of eco-efficiency in industrial estates are guiding the running projects, and are expected to result in more systematic “strategy-papers”, in order to give guidance for the future development of the PEC as well as policy aspects. The research on chemicals risk management and its significance for the competitiveness might serve as an example.

2.2.2 Definitions

In addition to the definitions concerning eco-efficiency and sustainable development, mentioned above under chapter 1, the component sticks to the BFS-components operating definitions for SMEs (which included small commercial farmers), agro-industry (from UNIDO and FAO) agro-business sub-sectors, competitiveness, service market and interventions.

2.2.3 Financial Reporting

The component also worked with the Programme management on the elaboration and commissioning of an Auftrags Monitoring System (AMS) financial reporting package that tracks expenditure by the component, project, sector, and intervention levels. This is still in an initial stage.

2.3 Personnel

2.3.1 Deployment Plan

The eco-efficiency component staff consists of the management, which is directly allocated to the projects (at the counterpart departments), and an overarching unit (at MoNRE), which consists of staff for the secretariat, management experts for cross-sectoral duties, intermittingly deployed consultants and technical backstopping by GTZ Planning and Development Division. In particular the last ones are shared between the both components. The personnel structure of the eco-efficiency component is coherent with the one of the BFS component, with its sector managers for specific agro-business sub-sectors.

2.3.2 Recruitment

The component staff, including the one of its projects, consists of two international long term expert (one for the component, the other for the energy project (E3Agro), 3 intermittingly working international experts (2 persons for MIS, 6 months/y and for RMP, 2 months/y), one project coordinator, one senior administration manager, one sector manager (recently employed), one coordinator in Chiang May, 3 secretaries (1 halftime for the component, 1 for RMP, 1 for MIS, 3 senior advisors (consultants, part-time), 1 driver.

2.3.3 Staff Development, counterpart training

Each of the projects in the eco-efficiency component conducted a number of trainings (see project description/status reports) in Thailand and abroad for counterparts, partly including staff. In addition to this there were counterpart trainings in project monitoring (Dec. 2004, in Germany), participation in an economic strategy seminar (July 2005), counterpart and staff training in Thailand in 2006 (moderation, mediation) and in enterprise competitiveness and market development, and in environmental management (regularly offered by InWent since 2004).

Further courses are planned for this year in project management, and eco-efficiency/sustainable development.

2.4 Projects and interventions

2.4.1 Redesign of projects and character of interventions

The projects in the framework of the eco-efficiency component, which had already been proposed and planned ahead of the AURA-Angebot to BMZ (E3Agro, MIS, RMP), had partly been redesigned, in order to reflect more closely the Angebot's objectives and indicators, as well as the initial focal area of agro-business, and the programme's "service-approach". This meant e.g. that the projects responded in particular to the focal area by taking e.g. a selected agricultural commodity as a pilot case (e.g. palm oil) for biomass energy or management information system, and that the chemicals risk management project increased its efforts towards service-orientation and the involvement of SMEs.

According to the new conditions some proposals in the field of eco-efficiency had been rejected.

The projects', as well as the component's interventions can be allocated to 3 categories: a) value chain or agro-business sub-sectors (in particular palm oil, tapioca, shrimps, saa-paper), b) generic sectors for the business enabling environment (like energy-efficiency, environmental information systems, chemicals risk management, c) eco-efficiency and environmental policy advisory and promotion (like eco-efficiency forums, special seminars).

The following is an executive summary of the status of these projects and interventions.

2.4.2 Interventions in the context of Tsunami rehabilitation

In particular during the first months after the Tsunami (January 2005 through May 2005), the component was engaged in advisory in the fields of environmental, area-related planning, marine ecology, eco-tourism, water and wastewater management and in the preparation of projects for environmentally compatible rehabilitation of the tsunami affected areas. Most of the activities only indirectly contributed to the programme's objectives; however, some of them opened up areas of potential co-operations for the PEC (like regional marketing for organic agricultural products on Ko Lanta, involvement of the PMBC (Phuket Marine Biology Center) in the field of shrimp and marine aquaculture, and ornamental fish).

2.4.3 Advisory services and promotion of eco-efficiency

The component developed the "Eco-Efficiency Forum" as an institution for awareness promotion of eco-efficiency-relevant issues. The forums are a half-day symposium, where higher-ranking governmental or enterprise representatives, the German Embassy and other institutions are invited to present their basic position; this is followed by the presentation of new research results in the scope of the PEC-objectives, and a round-table discussion with representatives of responsible departments, enterprises, and organizations. The main target group is the policy and decision-making level of governmental bodies, as well as the representatives of SMEs.

The first forum (July 2005) under the title "Eco-Efficiency – an asset of Environmental Policy" had been organized together with the MoNRE and contributed to the "cross-departmental" discussion on how to introduce eco-efficiency in industry. The second forum (January 2006), under the title "Chemicals Risk Management – staying ahead of the disasters" focused on the implementation of rules and guidelines, and chemicals risk management as an element of competitiveness. It had been organized together with MoNRE, MoInd, Federation of Thai Industry, Dep. of Disaster Prevention and Mitigation, the Mahidol University and Enterprises like Clariant, Bayer. Two more forums are planned in 2006, one on consumer advisory and its role for the promotion of environmental quality ("Consumer: driving force for food safety and environmental quality") and one presumably on eco-efficient design of industrial estates.

Beside these larger events, contributions by smaller seminars and workshops (on CDM, POP-convention, planning of other cooperation programmes (in particular to those, funded by the Danish and Japanese government), waste water purification systems, waste management) are to be mentioned.

2.4.3 On-going Projects

For the following projects (with the exception of the last one) see the attached project status reports. The first three projects had already been proposed and planned ahead of the start of the programme. They are stationed with an office at the counterpart's respective department, and have a very close cooperation relationship with the counterparts' staff. According to their scope of work, to their status as independent organizational units, and to the request of the partner organization, they are running on its own authority, however in coherence with the programme's logic and objectives. The interrelationships within the component and between the two components are constantly being developed and had been led to a number of joint interventions.

See the attached project reports for the following projects:

Strengthening the Competitiveness of Thai Agro-Industries through increased Energy Productivity (Energy and Eco-Efficiency in Agro-Industry, E3Agro-Project)

(Ministry of Energy, DEDE (Department of Alternative Energy Development and Efficiency), July 2004 until June 2006)

Risk Management for the Handling of Hazardous Materials by SMEs in the Bangpoo Area (Risk Management Project, RMP)

(Ministry of Industry, IEAT (Industrial Estate Authority of Thailand), October 2004 until September 2006)

Management Information Systems (MIS) for Industrial Pollution Prevention and Control (MIS-Project)

(Ministry of Industry, DIW (Department of Industrial Works), June 2005 until May 2007)

Promotion of Environmentally Friendly Saa-Paper

(Ministry of Natural Resources and Environment, DEQP (Department of Environmental Quality Promotion), October 2005 until September 2007)

Promotion of the Aquaculture Sector (Marine Shrimp)

(Ministry of Agriculture and Cooperatives, DoF (Department of Fisheries), January 2006 until December 2008)

This project is jointly implemented by the two components, under the coordination of the BFS component. The project status report is attached to the BFS component status report.

2.4.4 Expected, envisaged projects or interventions

There is a number of approaches to the component, in how far the scope of the programme would allow to support for planned projects or measures. The following ones are recently in more detailed screening discussion with the counterpart organization:

The MoNRE (PCD, pollution control department, DEQP) is requesting for support in the area of aquaculture, waste water management for fishery SMEs, chemicals risk management.

The NIA (National Innovation Agency, under the Ministry of Science and Technology) is looking for cooperation in the promotion of bioplastics. A joint approach had already been agreed upon for the conference and exhibition Bioplast 2006 in Bangkok.

The DEDE (Ministry of Energy) submitted a proposal for a project on biomass energy and energy efficiency.

The Thai Marine Shrimp Farmer Association (Surathani) requested support in brood stock development, certification and guidance for organic shrimp production and marketing. This request might lead to an intervention in the running project with the DoF.

The FTI (Federation of Thai Industry) submitted a request for a project on cleaner production application.

There are discussions with a developer (Advance Agro, AA; IEAT) of an industrial estate for agro-industrial SMEs, how to follow a holistic approach for the integration of eco-efficiency and chemicals risk management in particular to the planning of an estate.

DIW is discussing a proposal for chemicals risk management in the agro-industry.

2.5 Interventions

2.5.1 Definition

Interventions in the context of the PEC are a set of activities linked by a common purpose and aimed at influencing some change at both the enterprise and service provision levels. An intervention is defined as:

“Any significant allocation of programme resources (manpower or money) invested in a well-defined “sub-project” of a partner which is aimed at enhancing the competitiveness of SMEs through either improving the policy, legal, regulatory [or institutional] framework conditions for SMEs, stimulating the demand for services from SMEs, or improving the ability of the partner to provide better services (public or private) to SMEs.”

This section of the component status report will not elaborate the specific interventions that have already, or are being planned and implemented in the individual projects. Details of this will be found under their respective projects, even though they have not yet in each case been determined, because of the fact, that the project planning and the specifications in the plan of operations allocated their activities before the intervention-approach had been introduced. The component will build on the experiences of the BFS component with the definition, implementation and monitoring of interventions, and then re-arrange the project's activities and the component's initiatives (see paragraph 2.4 of the BFS component status report).

Examples for short term and long term interventions: participation in a trade fair in Germany which is designed to impact on sales and therefore competitiveness, eco-efficiency forum for contributing to eco-efficiency policy development, strengthening the capacity of a service provider to develop and sell better farm management, conducting a PREMA (Profitable Environmental Management) training for SME in order to demonstrate the results of a systematic resource oriented approach.

2.5.2 Current Status of Interventions

Taking the component-related interventions and those projects into account, which started in 2004 or 2005, presumably 18 out of 35 interventions have already been finished. However, this figure is subject to change according to the further re-arranging of the running activities, and the adjustment of the plans of operations.

2.6 Partnerships with Other German TC Instruments

Following the guiding principle of “EZ aus einem Guss”, the BMZ would like to see the most effective deployment and use of all German technical cooperation organizations and implementation instruments. In addition to those already stated under the BFS component status report, and besides the continuous exchange of information about activities or focal areas of CIM and InWent, the following ones are to be mentioned for the eco-efficiency component.

Since the beginning of the PEC, the component established a “GTZCIM-Eco-Eff-Group” which comprehends 6 Intern Experts from CIM Thailand and 9 experts and coordinators, who work for GTZ-projects. The group would meet every now and then on the occasion of a colloquium or event and communicates about news in the field of eco-efficiency, environmental policy and energy. This led to

the recommendation of German or Thai experts, presentation of papers at the respective organization or joint appearance at workshops or conferences, as well as determination of research or studies, which could be fed into certain interventions.

In particular the following activities shall be mentioned:

Waste management system at the PCD laboratory as a model for chemicals risk management and good chemicals housekeeping (Dr. Ulrike Lechner at the PCD)

Contribution to the planning workshops of the E3Agro-project, advisory services for energy related issues, contact potential in field of energy (Prof. Dr. Christoph Menke, Professor at the JGSEE, joint graduate school for energy and environment)

Envisaged cooperation in the context of quality standards (eco-labeling) for aquaculture products, regional and international scope (Dr. Theo Ebberts, SEAFDEC, Southeast Asian Fisheries Development Center)

In 2004 and 2005 InWent conducted a training sequence about “environmental management accounting”. The component had been involved in its implementation and contributed model cases from the saa-paper industry and took care of the participation of component-related enterprises and counterpart staff.

The SES (Senior Expert Service) is being involved for the recruitment of sector specialist for agro-business sub-sectors and eco-efficiency areas.

An envisaged joint initiative with an InWent program in the field of biotechnology had not been accepted by the BMZ.

2.7 Resource Allocation

Out of the 5 on-going projects 3 of them are at an advanced stage of implementation. The others started in late 2005 or early 2006. The table below shows an estimated allocation of GTZ resources for 2006.

Project	Estimated Budget 2006 in Euros
E3Agro	450,000
RMP	270,000
MIS	450,000
Saa-paper	90,000
Shrimps (marine shrimps) (see also BFS component)	(101,000)

3. Project Reports

3.1 E3Agro-Project (Energy and Eco-Efficiency in Agro-Industry) Strengthening the Competitiveness of Thai Agro-Industries through Increased Energy Productivity

3.1.1 Project Partners

Department of Alternative Energy Development and Efficiency (DEDE) under the Ministry of Energy and business associations

3.1.2 Duration

July 2004 to June 2006

3.1.3 SME Target Group

The target groups are selected sectors of Thai agro-industry especially with good potential for biomass energy and energy efficiency improvement like sugar, rice, palm oil, tapioca starch, wood and furniture industry. As a first pilot sector the palm oil industry has been picked. E3Agro is targeting 33 palm oil mills (July 2004) with wet milling process covering about 90% of Thai crude palm oil output. To reach the target group E3Agro is cooperating with the Palm Oil Crushers Association (POCA), local FTI chapters, other business organisations as well as service and technology providers.

Cooperation within the Programme

Other groups in the value chain of palm oil production like farmers and brokers are targeted under the Business and Financial Services Component of the Programme. The project "Management Information Services for Pollution Prevention" under the Eco-Efficiency Component is carrying on activities initiated under E3Agro Project by integrating them into a MIS for the palm oil mills.

3.1.4 Aim and Relevance of the Project

Thailand is one of the most energy intensive countries in the world. This makes it very vulnerable to oil price increases. An increase of 15 US\$ per barrel will decrease Thailand's trade balance by 2.8% in terms of GDP this is 4 times more than a highly industrialised countries like Japan /1/. To make things worse, Thailand is world champion in oil intensity (oil consumption per GDP) /2/. Since most of the oil has to be imported every major increase in oil price will eat up Thailand's export earnings and push its trade balance into the red. This affects Thailand's economy not only on a macro economic level, but as well the competitiveness of agro-enterprises.

Energy is an important aspect in agro-industry and has gained additional importance with rising energy prices and the search for renewable energy resources to substitute costly oil imports. On one hand agro-industry is the largest energy consumer in the Thai manufacturing sector on the other it has the biggest renewable energy potential. Biomass residues could generate 3.000 MW of electrical power, about 15% of Thailand's present peak load, if a favourable energy policy is put in place. Overall, it is estimated that Thai agro-industry could generate additional income of US\$ 1 billion annually /3/ through waste-to-energy and energy-efficiency improvements. The E3Agro Project aims to tap this potential.

The high vulnerability of its economy to increases in oil prices is well known to Thailand's government, which has established since the first oil crisis an energy conservation fund, as well compulsory as voluntary measures to improve energy efficiency. In addition own renewable energy resources are promoted and an ambitious target has been set to increase the share of renewable energy on total final energy consumption from 0.5% in 2002 to 8% by the year 2011. Biomass residues from agro-industry have the biggest economic potential for renewable energy. Further bio fuels (ethanol from sugar and starch and bio diesel from palm oil and jatropha) are promoted, to reduce dependence on oil imports.

As a first pilot sector the palm oil industry has been selected. Due to the biofuel programme of the Thai government it is on top of the political agenda and has high growth potential. By the year 2012, 10% of the national consumption of diesel shall come from palm oil. To achieve this target, the plantation area has to be expanded by a factor of five, having considerable impact on economy, environment and on rural population.

Less than 10% of the biomass from a palm tree is oil, 90% are residues. Since the highest value is in the crude palm oil (CPO), no and low value biomass residues have for many years just been perceived as a waste problem. However at the moment there is not much value added in the main process, since over the last years a large over capacity of mills has been built up, competing for limited raw material and keeping the prices of the fresh fruit bunches high. This means, that at the moment no or small profit is made by the mills from producing CPO. As long as demand outstrips supply this situation will remain and leads to fierce competition among the Thai palm oil mills. This economic pressure in combination with high energy prices and the determination of Thai government to promote renewable energies open new opportunities for the Thai palm oil mills to add value to their by products /3/.

With efficient technology, a palm oil mill could generate up to 10 MW of electricity from biomass residues. By generating biogas from the wastewater alone, it would be possible to produce more than 1 MW of electricity with efficient gas engines. So far, the applied technology is just as efficient in that no residues are piling up. The surplus of biomass is burned and the steam is blown into the air. The efficiency of electricity generation is about 3%.

It is estimated that with a feed in tariff of 3.6 Baht/kWh about 300 MW of electrical power could be installed just utilizing waste residues from palm oil industry alone. Additional income from electricity sales would amount to about 30% of the present turn over of palm oil mills and would give them a competitive edge over their neighbours Malaysia and Indonesia. In addition local value is added, since farmers would benefit from selling palm leaves and local jobs will be created for fuel logistics, fuel preparation and operation of biomass power plants. It also would alleviate the government from using public funds for additional power plant investments.

3.1.5 Project Goal and Indicators

The E3Agro Project has defined two long-term objectives, which shall be achieved in selected sectors of agro-industry.

- i) The utilization of biomass residues for energy production is increased
- ii) The energy efficiency of the production process is improved

These objectives are in line with Thailand's target to supply 8% of total final energy consumption with renewable energy and to improve energy efficiency of its industry.

The project has defined seven quantitative impact indicators, which shall be monitored over a four years period. By June 2008, at least 100 GWh of electricity per year should be sold by the palm oil mills to the public grid, thereby adding additional income of 5 million Euros annually from waste products (appendix).

3.1.6 Project Strategy

The E3Agro Project sees its role as a facilitator who gets all stakeholders involved in the implementation of the project interventions. Main stakeholders are beside the agro-industry and respective associations, technology and service providers, DEDE and other government organisations, the state utilities EGAT and PEA that are supposed to buy biomass electricity and local communities.

Private sector participation is a key element of the implementation strategy. The interest of businesses in the agro-industry, technology and service providers has to be gained in order to be successful. The development of a suitable energy policy framework will be critical to the success of the Project.

The palm oil sector with its high political relevance has been selected as a pilot case to push forward a supportive energy policy framework. This policy will benefit agro-industry and rural population as a whole.

The Project aims (i) to strengthen the competitiveness of the Thai agro-industry through the implementation of cost-effective production process technologies and professional management techniques as well as (ii) to promote the efficient use of energy and improve the utilisation of biomass for energy production. The Project will integrate the overall management of quality, environment, energy and information into a combined system of international best practice manufacturing.

E3Agro applies the PCT Model (Pilot Cases Transfer) to transfer experience, methods and instruments to promote energy and eco-efficiency within and beyond the palm oil sector to agro-industry /4/.

3.1.7 Project Results and Interventions

The Project is focussing on four main areas of interventions, targeting the policy, services and target group level as well as the issue of dissemination and transfer of project results within and beyond the pilot sector to ensure sustainability.

Intervention area 1: policy level - government organisations and lobby groups

Result1: Policy framework to support eco-/energy efficiency in agro-industry is developed and promoted.

- Provide policy papers and case studies how to promote waste to energy in agro-industry
- Carry out desk study on eco-efficiency in palm oil industry estimating the biomass energy and efficiency potential
- Facilitate speed up of approval process under Very Small Power Producers (VSPP) Act for grid connection

Intervention area 2: service level - service and technology providers

Result 2: Service and technology providers recognize market potential for biomass energy and efficiency improvements in palm oil mills and promote their products.

- Study tour on biomass energy in Germany
- Seminar on biomass energy technology for Thai palm oil industry
- Matchmaking, active involvement of service and technology providers

Intervention area 3: target group level - palm oil mills

Result 3: eco-efficiency benchmarking and best practice guidelines are developed and promoted.

- Conduct eco-efficiency baseline study in palm oil industry
- Introduce benchmarking and material flow management
- Conduct energy audits and pre-feasibility study
- Develop "Best Practice Eco-Efficiency Guidelines"
- Identify pilot projects

Intervention area 4: dissemination and transfer - all stakeholders

Result 4: Promotion programme for eco/energy-efficiency and biomass residue utilization is set up and running

- Develop information platform on the internet
- Develop and disseminate information material
- Set up and implement monitoring programme
- Provide certificates for successful cases

3.1.8 Relation to Programme Goal (indicators) and Component Goal (Indicators)

A successful E3Agro Project will contribute to all four Programme indicators:

- i) Increased utilization of biomass residues generation and energy efficiency improvements will add value to waste products and increase productivity and business performance of the palm oil mills (positive impact to indicator 1 and 2).
- ii) The introduction of an attractive feed in tariff for biomass energy will accelerate market penetration of innovative technologies in the following sectors: biogas technology, combined heat and power technology, efficient biomass power plants, innovative and energy efficient production processes. (ind.3)
- iii) Introduction of anaerobic treatment of wastewater with efficient generation and utilization of biogas will reduce organic load of wastewater (ind. 4).

The Project will as well contribute in a positive way to the achievement of all three indicators of the Eco-Efficiency component, addressing supportive policy, supply and demand for eco-efficiency services.

- i) Introduction of a feed in tariff for biomass energy and streamlined procedures for selling electricity will reduce solid and liquid waste problems of agro-industry and add value to their residues.
- ii) A more attractive energy policy and raising awareness for the waste to energy potential will increase the demand for services and efficient technology
- iii) The introduction of benchmarking and material flow management in the palm oil sector stimulates improvement measures in the mills and demand for services.

3.1.9 Project Benefits

Expected long-term benefits are:

- Reduced energy imports saving foreign currency and improving trade balance
- Higher local value added increasing rural income and jobs
- Higher productivity and competitiveness of Thai palm oil industry by adding value to waste products and by higher energy efficiency
- Making bio diesel production economical and ecological more feasible
- Lower environmental pollution for example through wastewater treatment with biogas plants and lowering greenhouse gas emissions; and
- Development of a new industrial sector "biomass energy", generating employment and income in a growth sector with good export prospects into neighbouring countries.

3.1.10 Key Competitiveness Issues

Due to good profit margins in the past and in expectation of growing supply due to the bio diesel programme of the Thai government an overcapacity of palm oil mills has been built up. Demand for fresh fruit bunches is outstripping supply and pushing the prices of raw materials up. The situation among the Thai palm oil mills is very competitive, many of them making no or only small profit at the moment. This and high-energy prices made the palm oil mills receptive to listen to waste to energy opportunities. Since all palm oil mills in Thailand are connected to the national grid (contrary to Malaysia and Indonesia) Thailand has a competitive advantage to its neighbours by adding value to waste products through electricity export. Rising energy prices further strengthen this advantage.

3.1.11 Status of Implementation

Impact – Results achieved so far

A feeding tariff for biomass energy of 3.8 Baht/kWh is accepted by the Ministry of Energy and will be proposed as part of a renewable energy act to the cabinet.

Procedures for selling electricity under VSPP have been simplified and made transparent. 3 more palm oil mills applied to sell electricity from biogas.

Seven key performance indicators have been defined to monitor the impact on the palm oil sector (appendix A) and a monitoring concept has been developed /5/. Monitoring is done by evaluating eco-efficiency benchmarking reports by telephone and by visits to the mills to inquire about implementation of improvement measures. First results show, that 50% of the palm oil mills under the benchmarking programme (18 out of 34 participate) have started to implement improvement

measures. Bigger investment in biomass energy projects however is pending due to the uncertainty when the new RE policy will be introduced. Awareness of mills for biomass energy and energy efficiency potential has considerably increased.

The project has been in contact with over 30 technology providers /6/, some of them actively contributing to the project through providing free measuring equipment and services, contributing to seminars and by showcasing their technology, providing information, contributing to feasibility studies and best practice guidelines. Several new providers especially for biogas technology started to become active in Thailand. At least one biogas plant was initiated directly through the project. At least two energy consultants involved in project activities got further contracts outside the project. One to supervise the installation of a new biogas plant paid by the mill, the other to carry out a detailed energy audit and improvement measures under the Value Engineering Programme supported from the Thai Encon Fund.

3.1.12 Status of interventions

intervention area 1: policy level

Various policy papers have been prepared, presented and submitted to relevant policy makers and stakeholders. Starting from the inception report /7/ which is highlighting energy policy issues and pointing out how Thailand can achieve its ambitious renewable energy targets. Also two case studies from Germany and India are presented highlighting the market penetration of biomass energy technology through introduction of feed in tariffs for renewable energy projects. This was followed by a policy paper, developing a scenario how the introduction of a feed in tariff would lead to biomass power plants in the Thai palm oil industry of 300 MW installed electrical capacity with marginal price increases of Thai electricity consumers /8/.

A further policy paper pointed out how Thailand could gain technological leadership in the palm oil industry and build up a new industrial sector in the field of biomass energy with export potential to neighbouring countries /9/. A study has been commissioned to point out economic, ecological and social impacts likely to be caused by various energy policies using the palm oil industry as pilot case /10/.

A desk study providing background information on the Thai palm oil industry, highlighting the palm oil process and eco-efficiency issues at palm oil mills has been completed in October 2004 /11/. The application procedure to sell electricity under the VSPP programme has been analysed. Through roundtable discussions with respective stakeholders the procedures could be made transparent and simplified /12/. Duration of the standard application procedure could be reduced by 40%.

Intervention area 2: service level – service and technology providers

In order to promote technology transfer in biomass energy, a study tour to Germany had been organized. Participants from 7 Thai palm oil mills joined the tour at their own expense to learn about German technology in the area of biomass, biogas, gas engine and turbine technologies.

The study tour was followed up by a visit to Thailand of German technology providers who presented their eco-efficiency technologies to a wider audience. Three local energy consultants have been trained to understand the palm oil milling process and to carry out energy audits, and material flow analysis and to advise on benchmarking and improvement measures.

Intervention area 3: target group level - palm oil mills

In November 2004 an eco-efficiency baseline study has been conducted, by visiting 10 palm oil mills. Only data readily available have been collected and analyzed. The results have been summarized in a base line report /13/ serving as reference to evaluate project impacts. Further an eco-efficiency benchmarking concept has been developed and presented to POCA /14/.

A detailed energy audit been carried out in a typical palm oil mill to determine the material and energy flow /15/. From this reliable data on the biomass energy and energy efficiency potential have been gained, which were used to carry out a pre-feasibility study for a biomass power plant in order to analyse the economic viability of biomass energy projects /16/.

A kick off benchmarking workshop /17/ in June 2005 addressing palm oil mill owners, helped to raise awareness further and to get commitment of 18 palm oil mills to join the benchmarking project. Jointly with mills and the support of POCA 8 key performance indicators (KPIs) have been defined

measuring the performance of mills from specific electricity consumption to waste water output /17/. Two local consultant teams and three international energy experts have been hired to support the mills in establishing a benchmarking system and material flow management in their mills and to compile guidelines for improvement measures. A series of three workshops have been carried out so far followed up by consultant visits. Each mill is sending its performance data to the E3Agro benchmarking coordinator who is compiling feed back reports, showing the performance of the individual mills compared to others in an anonymous way. Each mill received a consultant report with recommendations for improvement measures /18/.

Feedback reports are sent on a quarterly basis /19/. Two guidebooks for palm oil mills, one on Energy Management /20/ the other on Energy Technology /21/ have been submitted and are presently commented by the mills. Many mills have started implementation of smaller improvement measures by their own. Until end of June at least one bigger pilot project shall be identified.

Intervention area 4: dissemination and transfer – all stake holders

The concept for a webpage serving as an information platform for all stakeholders has been developed. Technology and service providers will be allowed to display information on their products. A web consultant has been contracted for development of the webpage and implementation. Various information materials, presentations, leaflets, fact sheets, reports and a project video have been produced and disseminated. A monitoring programme has been set up. Results from the monitoring will be used as a feedback to stakeholders for further promotion and dissemination of biomass energy and energy efficiency projects.

3.1.13 Allocation of Resources for E3Agro Project

Contributions Personnel	GTZ	DEDE/Thai Industry
Management		
• Project Director, Manager, Advisor	24 wm	4 wm
• Sector Manager	wm	wm
• Technical Manager, Project TL,	wm	8 wm
Implementation Personnel		
• Govt. Officers (C4 – C7), energy expert	24 wm	48 wm
• Short Term Experts	22 wm	22 wm
• Support Personnel	24 wm	12 wm
Totals	94 wm	94 wm
Percentages	50 %	50 %
Contributions In-kind (THB)		
• Office accommodation(40smx350x24)		340,000
• Others (phone, transport, photoc.,etc)	-	260,000
Totals	-	600,000
Percentages	-	100 %
Contributions in Cash (THB)		
Project Management:		
• Computers, fax, phone	500,000	
• Consumables and office costs	100,000	
• Travel and accommodation (in. bm-ws)	400,000	400,000
• Project personnel	-	
• General studies	-	
• Training / Study tours / Overseas trip	100,000	1,000,000
Interventions		-
• Short term experts international	6,000,000	-
• Workshops	250,000	2,000,000
• Specific studies (outsourced)	750,000	-
• Local consultants	5,000,000	2,000,000
• Exhibitions	-	-
• Other intervention costs	2,000,000	400,000
Totals (cash and in-kind)	15,100,000	6,400,000
Percentages (cash and in-kind)	70%	30 %

3.1.14 Key Performance Indicators of the E3Agro Project for Palm Oil Industry

Thai – German Development Program Goal:

- Competitiveness and environmental sustainable production (eco-efficient) in SME has improved

E3Agro Project Objective:

In selected sectors of Thai agro-industry

- Utilization of biomass residues for energy production has increased
- Energy efficiency has improved

Impact Indicators

1. By **June 2006, at least 20 CPO mills** (out of 33) and by **June 2007, at least 30 CPO mills** participated in the project activities.
2. By **June 2006, at least 4 CPO mills** and by **June 2007, at least 12 CPO mills** have started to implement improvement measures.
3. By **June 2006, at least 24 CPO mills** have signed a contract to sell electricity to grid (VSPP).
4. By **June 2007, at least 12 CPO mills** have used services from service providers.
5. By **June 2008, at least 12 CPO mills** increase energy efficiency (GJ per ton FFB) by 10%.
6. By **June 2008, at least 8 CPO mills** generating electricity from biogas.
7. By **June 2008, at least 100 GWh¹** of electricity generated from biomass (solid + liquid waste) sold to grid annually.

¹ 100 GWh comes from 2 sources of energy:

• From Biogas: 8 mills x 7,000 production hrs./year x 1 MW/mill	= 56	GWh	
• From Steam Turbine: 15 mills x 6,000 production hrs./year x 0.5 MW/mill	= 45	GWh	
	Total	= 101	GWh

0.5 MW/mill = 1.2 MW full capacity of the steam turbine – 0.7 MW actual load per day (estimation from Asian Palm Oil)

3.1 Risk Management for Handling of Hazardous Materials by SMEs in the Bangpoo Area (Risk Management Project – RMP)

3.2.1 Project Partners

Department of Environment and Safety, Industrial Estate Authority of Thailand (IEAT) and Safety Technology Bureau, Department of Industrial Works (DIW), Ministry of Industry (MoInd)

3.2.2 Duration

October 2004 to September 2006

3.2.3 SME Target Groups

The target group or beneficiaries for this Project are divided into three main parts as follows.

- The policy making level (Macro): these include the authorities both providing services to and controlling the factories, including Industrial Estate Authority of Thailand (IEAT), Department of Industrial Works (DIW), Pollution Control Department (PCD), Samutprakarn Provincial Offices – Industrial Office, Disaster Prevention and Mitigation Office, Public Health Office, Occupational Health Office, etc.
- The service level (Meso): academic institutions, The Federation of Thai Industries (FTI), Responsible Care Committee of Thailand, consulting companies, etc.
- The working level (Micro): The SMEs inside and surrounding Bangpoo Industrial Estate² dealing with hazardous materials in their business, being storage, handling, processing and repacking. There are in total 88 factories in line with the target group criteria with the 12 categories having to submit Risk Assessment and Risk Management to the authority, Department of Industrial Works (DIW) under Factory Act³. From these 88 factories, about 95 percent or 83 factories are considered as SMEs.

3.2.4 Aim and Relevance of the Project

The amount of hazardous materials being produced in Thailand has steadily increased over the last 30 years. In this context the safe and proper handling of these materials gains increasing importance and will contribute to the competitiveness and the safety of the Thai industry.

In particular, Thailand's more than 30 industrial estates with their high density of industries produce a concentration of hazardous materials, which has become a subject of public concern. One of the oldest and most important industrial estates of Thailand is the Bangpoo Industrial estate. It is located just 35 km south east of Bangkok and is homed to more than 80 companies dealing with hazardous materials. About 95% of these companies can be considered as SMEs and have limited access to appropriate knowledge about the risks and hazards of the materials they are dealing with.

A serious accident with no proper risk management system installed could result in enormous human and material losses, not only to the affected firm but also to the whole industrial estate as well as the surrounding communities.

Apart from increasing the safety of a whole region, the safe handling of hazardous materials will also improve the business processes of the companies and therefore optimize their production processes, which lead to decreasing production and process costs. SMEs will be able to comply with international safety requirements and thus gain access to a broader market. Industrial estates known for a good safety management system will be able to attract more international companies that are interested in a safe business environment and proper service facilities for their business operations.

² The Bangpoo Area covering Bangpoo, Bangpoo Mai and Praeksa Municipalities of Muang District, Samutprakarn Province, about 35 km. south-east of Bangkok.

³ The Notification of the Ministry of Industry No.3 in B.E.2542 (A.D.1999)

3.2.5 Project Goal and Indicators

Enhancing the competitiveness of SMEs by applying the international safety requirements as well as minimizing losses and damages caused by handling, producing and storing of hazardous materials

Relative number of emergency incidents involving the hazardous materials reduced by 5% (at the end of the project against the end of 2004 based on the study of the net benefits of Risk Management for SMEs Competitiveness and the impact to National Economy)

An increasing number of SMEs participating in the project and using Eco-efficiency principles and improve their competitiveness by increasing the occupational health as well as safety culture in their companies

3.2.6 Project Results and Interventions

Result 1: A Risk Assessment and Risk Profile for SME factories dealing with HazMat in Bangpoo area are established – with following indicator:

1.1 The “*first draft*” Risk Assessment and Risk Profile of Bangpoo area is available in 9 months after the project starts

Result 2: Improvement of Safety Measures for SME factories dealing with HazMat in Bangpoo Area is sufficiently implemented – with following indicators:

2.1 Number of participating SMEs (70 factories in the inventory programme and 50% of SMEs dealing with hazardous materials in the implementation programme)

2.2 Relative number of emergency incidents involving the hazardous materials reduced by 5% (at the end of the project against the end of 2004 based on the study of the net benefits)

Result 3: An Integrated Contingency Plan for Bangpoo Area is established and sufficiently functional – with following indicator:

3.1 An integrated contingency plan in Bangpoo area is available in 24 months after the project starts

Result 4: An Emergency Management Information System for supporting SME factories dealing with hazardous substances in Bangpoo area is available and sufficiently functional – with following indicators:

4.1 An Emergency Management Information System (EMIS) concerning HazMat is made available in 18 months after the project starts,

4.2 200 Number of users accessing the database and giving feedbacks

Result 5: Bangpoo Emergency Response Centre dealing with HazMat incidents for SME factories in Bangpoo area is established and sufficiently functional – with following indicators:

5.1 EMAG’s MoU to be signed by 12 months after the project starts,

5.2 An Emergency Response, Safety Information and Training Centre of Bangpoo area is functional in 24 months after the project starts,

5.3 A selected factory conducts a drilling once a year after the integrated contingency plan is finished

The Study of Risk Management vs. the competitiveness of SMEs

The study was conducted by Department of Occupational Health and Safety, Faculty of Public Health, Mahidol University according to the resolution of the Project Management Team (PMT) Workshop in Oct 2004. The study is aimed to provide a concrete argument on the Chemicals Risk Management as a factor of competitiveness of SMEs. The study was conducted by surveying the factories dealing with agro-chemical business in Bangpoo industrial estate for 19 factories.

The results show that the factories do not implement the risk management system in particular on the Occupational Safety and Health Management System (ISO 18001) have about 2 times more investment, 9 times more compensation and 5 times more damage rate than those factories applying the system. This obviously proves that SMEs implementing Risk Management System gain more competitive. The result of study was presented for more aware and influential to the SMEs in

Bangpoo area several times in the Conference & Seminar and in an international Eco-efficiency Forum on the Chemicals Risk Management Forum in January 2006.

Improving policy makers

3.2.6 Hazmat Conference 2005 in Sydney, Australia: May 12-13, 2005

The passive participation of this event was aimed to create awareness for the counterpart of the project. They have a chance to see the up-to-date situation of the chemicals management system in Australia which is showing the same direction as in Europe and even in a globally harmonized system to achieve the control and management of hazmat. The experiences gained from this conference were further transferred to the working groups and Project Management Team (PMT) in their meetings last year and Project Management Board (PMB) recently held this year for further policy making to appropriately adapt to Thailand. There were 5 participants joining this conference; four from IEAT and Bangpoo Industrial Estate (BPIE) and one from the project (GTZ). The cost was shared by IEAT on the international airfares from Bangkok to Sydney with returned flight while GTZ took care on the registration fee, meals and accommodation in Sydney. The proportion of which between GTZ and IEAT is at about 60%: 40%.

3.2.7 Eco Industrial Development Workshop in Shanghai/Hangzhou, China: Aug 31-Sep 2, 2005

The project was asked to participate in this workshop as one of the speaker on the Emergency Response Planning issue. The proposal was agreed upon because the project wanted to exchange some knowledge of this issue with other countries. Like in China and Indonesia, which also joined this event. China received the technical assistance from EU and Indonesia also got some assistance from GTZ. Since one of the project's visions is to spread out the knowledge gained to neighbouring countries, this event gave a good opportunity to open up to the international arena. The cost of this trip was divided by GTZ and Royal Thai Government (IEAT and DIW) at about 65%:35% respectively with the same procedure made for the Hazmat Conference 2005. The experiences gained from this workshop were also presented to the working groups and Project Management Team (PMT) in their meetings last year and Project Management Board (PMB) recently held this year for further policy making to appropriately adapt to Thailand.

Improving services to SMEs

The project is organizing a series of training courses related to the project activities to enhance the services to the SMEs by the government agencies and institutions in Thailand and in particular in the Bangpoo Area. The envisaged training courses include Dangerous Goods Safety and OHS, Emergency Response Planning, and Production & Product Safety. Each course is planned to last for two weeks.

Improving Eco-Efficient Services for SMEs is one of its fundamental instruments, to cope with the demand for competitiveness. In this context, the Project Management Team (PMT) of the Risk Management Project (RMP) on its Planning Workshop on November 1-3, 2005, proposed training courses. This is due to the analyses of qualification needs of Thai officials and representatives of the SMEs involved in the project. The participating major companies BASF (Thai) Ltd., Bayer (Thai) Ltd. and Clariant Chemicals (Thailand) Ltd. which signed a Memorandum of Understanding (MoU) with the project together with other relevant authorities in April 2005 as well as other companies in Germany, e.g., Infracore Logistics GmbH in Frankfurt Industrial Park Hoechst, Merck KGaA in Darmstadt and DEKRA Umwelt GmbH in Stuttgart offered comprehensive training in Thailand as well as abroad.

Keeping in mind that training and qualification of counterpart personnel is indispensable for a sustainable development, and consequently this is one of the project's prime concerns, special attention shall be given to an independent and state-of-the-art knowledge transfer carried out both from industrial and other resources in order to further educate the participating Thai agencies and the target group of the project.

Reflecting the various possibilities and necessities in this regard and to achieve our project objectives in the most appropriated and professional manner, the following sequence of courses/trainings are being conducted:

Training Course # 1: organized on Jan 30-Feb 10, 2006

Special training and knowledge transfer focusing on DANGEROUS GOODS SAFETY and OCCUPANTIONAL HEALTH AND SAFETY carried out in close connection with Infraser Logistics GmbH, Clariant Chemicals (Germany) GmbH, Frankfurt, and a responsible State Authority in Germany with total participants of 7 persons; three from government authorities, one from academic institution, two from participating private sector and one from the Project (GTZ)

Training Course # 2: organized on Mar 13-24, 2006

Special training and knowledge transfer focusing on EMERGENCY RESPONSE PLANNING carried out in close connection with Merck KGaA in Darmstadt and BASF AG in Ludwigshafen in Germany with total participants of 6 persons; three from government authorities, one from academic institution, one from participating private sector and one from the Project (GTZ)

Training Course # 3: to be organized on May 22-June 2, 2006

Special training and knowledge transfer focusing on PRODUCT & PRODUCTION SAFETY carried out in close connection with DEKRA Umwelt GmbH in Stuttgart and BAYER AG Leverkusen / Dormagen in Germany with total participants of 5 persons; three from government authorities, one from academic institution, and one from the Project (GTZ),

Following to these three training courses, the participants will create a network for providing further training and consulting of the SMEs in the Bangpoo area and during the weekend in between each training course, a workshop with the experts in Germany is conducted to facilitate the knowledge transfers and squeezed out the experiences gained in the training for future possible implementation in Thailand to improve the safety measures for SMEs in the Bangpoo area.

Since these training courses are organized based on sharing cost basis among the parties involved, the proportion of expenses in the first training course was roughly estimated and found that the expenses of GTZ:RTG:PS = 25%:15%:60%. The calculation is based the sharing cost between GTZ, Royal Thai Government and Private sector in Germany. GTZ is responsible for organizing, meals, accommodation and transport inside Germany, the Royal Thai Government is responsible for international airfares and the private sector in Germany is responsible for meals and expert costs for training and arrangement of the course.

3.2.7 Key competitiveness issues

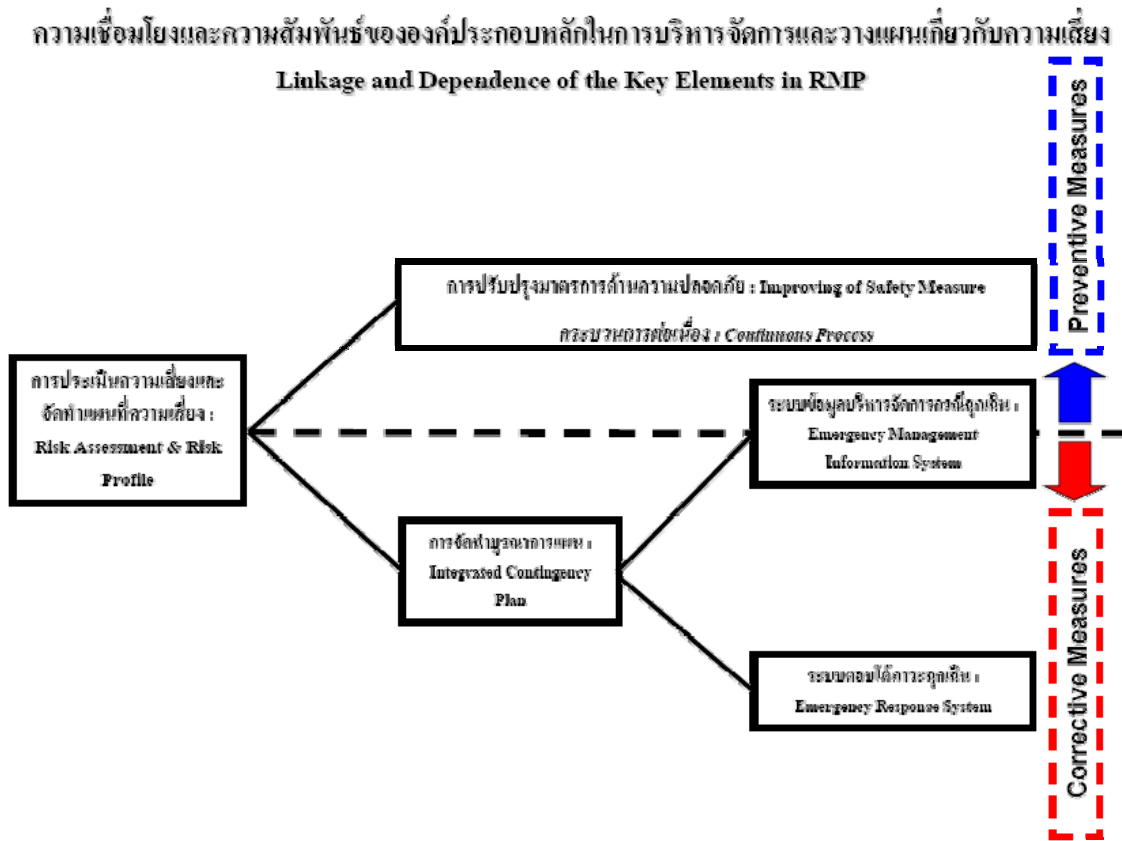
Improving the acceptance of the global market due to the compliance with the international safety standard and improving services to SMEs by training core group in Germany

3.2.8 Status of Implementation

The Risk Assessment and Risk Profile for 88 factories in the Bangpoo Area were conducted and finalized using the questionnaires designed by the International Consultant (IC) from Germany. NPC-SE, The National Consultant (NC) was contracted by GTZ to carry out the survey. The surveyed data were analyzed by the IC and presented in several meetings with Project Management Board (PMB) and some working groups. According to the agreed evaluation system made during the workshops with between the IC and working group last in 2005, there are 13 companies in a red zone, 42 companies in yellow zone and 13 companies in a green zone. Some proposed measures to improve the red companies were raised in the last meetings, such as provide training and consultation to them, the government to set up some policies, such as give incentives to those companies participating in the risk management program, etc. This Risk Assessment system is being made in form of the instant program which the companies can made self-assessment and the results will be shown directly in few seconds. This will ease the improvement of the safety measures for the SMEs in the Bangpoo area.

In connection with this issue, GTZ will send one German consultant to give a training course “How to Use the Risk Assessment Program as a tool to improve the safety measures in the factories and industrial estate” to IEAT, DIW and pilot factories (3-4 both inside and outside BPIE) followed by a meeting with all factories participating in the project to introduce this program and discuss about how to proceed in the future.

According to the project results, the following diagram shows the linkage and independence of the key elements in Risk Management Project.



For improvement of safety measures, several training courses for SMEs in Bangpoo area were made, i.e., Chemicals Risk Management Conference in Oct 2005 with about 100 participants and Training course on “How to get appropriate information” in Jan 2006 with about 90 participants in Bangpoo industrial estate office. Future trainings are planned according to organize in combination with the core team who got training courses in Germany in most required topics according to the risk assessment analysis.

The integrated contingency plan for the Bangpoo area was drafted and will discussed a workshop in late April 2006. Then, a drilling exercise will be conducted in June 2006 with a combined effort with other authorities, like municipalities, public health provincial office, disaster prevention and mitigation provincial office, etc.

The emergency management information system is being compilation of data from the factories to finally make a Rapid Response Information Database tailored made for Bangpoo area to be available in the Bangpoo Emergency Response Center (BERC). The BERC will be equipped with all necessary equipment and upgraded as the centre for communication in case of emergency and sharing equipment and materials.

3.2.8 Status of Interventions

Completed interventions: Two training courses in Germany, Workshop in China, Conference in Australia, Risk Management study

On-going Interventions: Training course in Germany still one more to come

Valid Interventions: Agreement on supporting the training – Royal Thai Government / Private sector

Raw Interventions: Drilling in June 06

3.2.9 Allocation of Resources

Item	Applicant's Contribution		German Contribution	
	Thai Baht	MM	EURO	MM
1. Personnel (MM)				
Project Director and Project Manager		24		0
Project Technical Coordinator (External)		0		8
National Project Coordinator		48		24
Support staff		42		24
Short term expert				10 IC/10 NC
Sub-total (MM)		114		76
2. Office Equipment				
Office space (IEAT)	600,000			
Materials and equipment (office, IT equipment paid by German)	650,000		15,000	
Operational equipment and accessories for Result 5 (responsible by IEAT/BPIE)	1,500,000			
Operational equipment and accessories for Result 4 (responsible by DIW)	1,500,000			
Sub-total (Baht)	4,250,000		750,000	
3. Operation and Administration Cost				
About 7% of the cost provided by GTZ	500,000		45,000	
Administration cost of Thai side covered by Thai side				
Sub-total (Baht)	500,000		2,250,000	
4. Workshops/Trainings				
Attendance of seminars, conferences, etc.	1,200,000		60,000	
Study trip				
Trainings				
Sub-total (Baht)	1,200,000		3,000,000	
5. Travel and Accommodation				
Each party is responsible for oneself (if not the trainings or workshops, then it's in line 4)				
6. Other costs				
Publication, public awareness, etc.	650,000		10,000	
Sub-total (Baht)	650,000		500,000	
Grand Total	6,600,000	114	6,500,000	76
Proportion (%)	50	60	50	40

Remarks: Use the exchange rate for rough calculation at 50 Baht: 1 EUR

3.3 Management Information Systems (MIS) for Industrial Pollution Prevention and Control (MIS)

3.3.1 Partners

Department of Industrial Works (DIW).

3.3.2 Duration

June 2005 to May 2007

3.3.3 SME Target Group

The project has three target groups:

- DIW as responsible authority for industrial pollution control.
- SMEs of the following two industrial sub-sectors:
 - Palm oil mills, mainly located in Southern Thailand (Krabi, Chumporn, Surat Thani and other provinces).
 - Producers of native starch, to be found predominantly in Northeast and East Thailand, but also in Central and North Thailand.
- The public in general, demanding comprehensive information on industrial development and pollution.

3.3.4 Aim and Relevance of the Project

In Thailand, governmental agencies lack reliable information on the environmental impact caused by the industry and there is a high improvement potential on efficient industrial emission control. Existing regulations require certain industrial sub-sectors considered having a significant impact to report on environmental issues, but the reported data are not being used, verified and analyzed efficiently. Furthermore, due to the lack of consistently managed base data, information on industrial emissions is not being disclosed to the public routinely.

At the same time, most SMEs lack suitable management tools to analyze their production process and identify space for improvement of their eco-efficiency and general competitiveness. Management Information Systems (MIS) based on reliable and adequately stored data could strengthen their awareness on environmental issues and focus attention on possible improvements of the production process, but required local consultancy services on MIS for SMEs are practically not available so far. MIS can be implemented and used successfully at SMEs of most of the agro-industrial sub-sectors. As priority sub-sectors for the pilot introduction of MIS the palm oil and native starch producers have been chosen, representing two of the most important agro-industries in Thailand with major contribution to the country's development: The vast majority of oil palm plantations (more than 3,000 km²) and palm oil mills (38 applying the standard wet process) in Thailand is located in the south. The share of palm oil in Thailand's vegetable oil industry is about 58 %, indicating the importance of palm oil for the country's supply of edible oil. Tapioca starch is extracted from the root of the cassava plant, which has an ability to grow in low-nutrient soils where other crops do not grow well. Furthermore, the cassava plant can tolerate drought. Cassava roots can be stored in the ground for more than two years, thus harvest may be delayed until market, processing, or other conditions are favourable. The cassava crop is especially important for farmers in relatively poor Northeast Thailand; total area of tapioca plantation in Thailand is more than 10,000 km², and nearly half of the 85 native starch factories are located in the northeast.

3.3.5 Project Goal and Indicators

At the end of the project, comprehensive policies and measures of governmental agencies and all stakeholders to facilitate eco-efficiency of SMEs will be enhanced. This will be verified through the fulfilment of the project's key indicators defined as:

- Industrial environmental databases (air, water, waste) for selected sectors are effectively used.
- Demand of SMEs in selected sectors for MIS application to improve their eco-efficiency is increasing.

3.3.6 Project Results, Interventions and Indicators

All project activities deal with the introduction of modern information systems as basis for better decision making of different target groups:

- Result 1: Environmental Information System (EIS) for DIW.
- Result 2: Management Information Systems (MIS) for SMEs of selected sectors.
- Result 3: Local consultancy services related to MIS for SMEs.
- Result 4: (Internet-based) Public Information Centre (PIC) on industrial environmental pollution.

The first main task is to implement an Environmental Information System (EIS) at DIW to efficiently track, analyze and control industrial emissions. The system will be based on data of inspection reports and those delivered by the factories. Currently, these data are reported and processed in analogue format (on paper). Consequently, the introduction of EIS, first of all, targets on improving the efficiency of the respective revision and approval procedures. It will furthermore enable DIW to check more consistently the plausibility of the reported data and to monitor and analyze the development of industrial environmental issues by sub-sector and by region.

The database on industrial pollution will also provide indispensable base information for policy making on industrial development. From the industry's point of view, the system will improve the quality of public services delivered by DIW. The respective key performance indicators have been set as (a) number of categorized databases (including subcategories, namely relevant parameters) and defined benchmark indicators in the environmental information systems, and (b) number of central and local agencies who access the industrial pollution data and information.

The second main task focuses on the joint implementation of MIS at SMEs of selected sectors. For most SMEs in Thailand, MIS is a completely new decision making tool. Very few companies have already experience with MIS, but their systems concentrate mainly on accounting-related issues, such as acquisition of raw materials and sales. Based on comprehensive user requirements and capacity assessments and in close cooperation with the respective industrial associations, the project will develop and promote standard databases, production process models and MIS software to allow material flow analysis and provide valuable information for decision makers to improve eco-efficiency and competitiveness of the companies. The latter will be the key to encourage the SMEs to implement and efficiently use such systems.

Although at the beginning only a part of the companies of the selected sub-sectors will introduce MIS, it is expected that others will follow to stay competitive. The key performance indicators and targets for this task have been established as follows: at least 30 % of the palm oils mills and 10 % of the native starch producers implement databases / MIS for improved eco-efficiency by May 2006.

The third main task faces the fact that up to now there are practically no local MIS-related consultancy services available for Thai SMEs. These services will be extremely important to guarantee the sustainability of result 2, since the SMEs will need further support in implementing and adequately using such systems. Therefore, the project will implement a training and evaluation programme for local consultants and encourage them to support the MIS implementation process in the two selected sub-sectors. It can be assumed that local consultants will be highly interested to participate, because result 2 will already create an initial market for their services.

Furthermore, the consultants will be interested to spread their services to other industrial sectors. The number of qualified local MIS consultants has been set as key performance indicator.

The fourth main task targets on the design and implementation of an Internet-based Public Information Centre (PIC) on industrial environmental issues considering the specific interests of the public as expressed by key representatives (multipliers such as journalists, scientists, NGOs and politicians) and the available information (in big part provided by the EIS). The information to be published has to be relevant, in the public interest, topical, correctly interpretable by non-experts, and reliable. The frequency of the use of the PIC has been established as key performance indicator.

3.3.7 Key Competitiveness Issues

Introduction of databases for material flow monitoring and analysis of the production process together with the analytical tool MIS (result 2) aim at improving eco-efficiency and competitiveness of SMEs in two selected agro-industrial sub-sectors: palm oil and native starch production.

Palm oil production is one of the important agro-industries in Thailand with major contribution to the country's development during the past 20 years. Palm oil is listed for free trade by the Asean Free Trade Area (AFTA), but due to the strong competition particularly emerged from Malaysian and Indonesian companies, Thailand had to request temporal suspension of free trade to give the domestic palm oil industry time to become more competitive. Oil palm varieties, plantation management, extraction and refinery technologies as well as down-stream processing and the utilization of by-products has to be further developed and improved to catch up with other palm oil producers in Southeast Asia. In this regard, the MIS Project focuses on providing suitable information technology (IT) tools for monitoring, analyzing and improving the material flows of the production process of palm oil mills. The system to be implemented will furthermore complement initiatives initiated by the E3Agro Project related to benchmarking and more efficient energy utilization.

Thailand is recognised as the largest exporter of tapioca starch in the world. Annual production capacity has increased from originally hundreds of thousand to three million tonnes, and is expected to reach four million tonnes in the near future. The export volume has ascended to one million and eight hundred thousand tonnes per year. Over the past decades, the number of starch factories has increased significantly. To stay competitive, native starch factories are required to assure product quality, to offer competitive product pricing, as well as to increase production.

MIS could help the company management to improve eco-efficiency, leading to a reduction of production costs, better management of environmental risks and compliance with requirements of customers and governmental agencies. However, at present most native starch factories pay more attention to raw material management than eco-efficiency improvement; importance and benefits of data collection and analysis for production process enhancement through gap analysis and eco-efficiency improvement has not much been realized by the industry.

Even though the project has selected the two above mentioned sub-sectors for pilot MIS implementation, the project's approach is much broader and aims at the introduction of a local service market for consultants in MIS for SMEs (result 3) for a wide range of – not only agro-industrial – sectors through specific training measures including practical application of MIS and the creation of an initial demand in the two pilot sectors.

The MIS software to be introduced by the project is an extremely flexible tool whose core component – the production process and material flow model – can be adapted to the requirements of most industrial sectors. Thus, it can be assumed that the trained consultants will spread this or similar tools to a variety of SMEs in the future.

The development and implementation of an Environmental Information System (EIS, result 1) and the Public Information Centre (PIC, result 4) will improve the services delivered by DIW to SMEs (e.g. by more consequent and impartial law enforcement) and public awareness on industrial environmental issues and contribute to strengthen a sustainable industrial development which will back up competitiveness of SMEs in the medium and long terms.

3.3.8 Status of Implementation

Project on-site implementation started on June 1, 2005. Project and office infrastructure (responsibilities for management and coordination, set-up of four result-related working groups each with approximately ten members from different bureaus of DIW, Project Management Committee) was established in June and July 2005. A project-planning workshop was carried out in Bangkok on June 22, 2005; 50 participants joined the event including representatives from the Ministry of Natural Resources and the Environment, the Federation of Thai Industries and GTZ projects. The outcomes were subsequently further elaborated in four workshops in July 2005 and combined in the Project Implementation Plan and the Annual Project Activity Plan. Project activities have been carried out according to these plans. The next planning workshop will be held in May 2006.

3.3.9 Status of Interventions

Completed Interventions

Result 1: Environmental Information System (EIS):

- Existing databases and reporting / data collection procedures at DIW have been studied and analyzed.
- A vision for a future EIS at DIW was outlined during a workshop on EIS.
- An overview study on existing EIS (systems used by different state authorities in Germany, Europe) was carried out, presented to officials of the involved bureaus and discussed as reference for a future EIS at DIW.
- A medium-term, step-wise implementation strategy for an EIS focusing on industrial environmental issues (point sources) was elaborated. The future set-up of integrated databases as foundation of a comprehensive EIS will require far-reaching changes / adjustments of administrative procedures.

Result 2: Management Information Systems (MIS):

- Two representative surveys and baseline studies were carried out (palm oil and native starch production) with the objectives to (1) understand the current status of the business, MIS awareness, data collection and information management, (2) identify and abstract the typical production processes including usage of raw materials, energy consumption, products, by-products, waste and emissions, (3) assess the capacity for applying MIS, (4) identify specific user needs and expectations related to MIS application, and (5) provide baseline information for future measurement of the impact of project interventions.
- Two seminars for SMEs were organized to promote and discuss possible benefits of production process data collection and MIS utilization.
- Two sub-sector specific MIS guidelines were elaborated in coordination with the respective sub-sector associations aiming to (1) promote the importance, principles and benefits of MIS for improving eco-efficiency and enhancing business competitiveness, (2) encourage SMEs to collect and analyze data related to the production process and eco-efficiency and make use of the information for decision making, and (3) provide introductory guidance for implementing and applying MIS.
- A survey on market available MIS software was carried out as important contribution to decide which product shall be used by the project.
- A design for the MIS software to be promoted by the project and an implementation strategy was worked out.
- Standard databases for SMEs were designed and programmed, including interfaces for daily, monthly and annual data entry and instant reporting functionalities (in both Thai and English language).
- The project and its initiatives related to MIS implementation at SMEs were presented live on Thai TV Channel 11 in an one hour broadcast on December 11, 2005, by the Director General of DIW, the President of the Thai Palm Oil Association and two German project members with the objective to further promote the public awareness of this important decision-making tool.

Result 3: Local consultancy services related to MIS:

No interventions have been carried out so far according to the Project Implementation Plan.

Result 4: Public Information Centre (PIC):

- An assessment study on awareness, requirements and expectations of key representatives of the public (NGOs, journalists, scientists, politicians) was carried out to understand the interests of the public.
- An overview study on existing PIC (Europe, UN, UK, Canada, USA, Australia) was carried out to analyze current international state-of-the-art and identify suitable elements for a Thai PIC on industrial environmental issues.
- A proposal on draft contents of a future PIC was elaborated. Basis for this system is a functional and continuously updated EIS database.

Valid Interventions*Result 1: Environmental Information System (EIS):*

- Forms for industrial reporting and factory inspections are currently revised and adjusted to capture data useful for and compatible with the future EIS.
- A proposal on changes of administrative procedures necessary for a more consistent and efficient management of digital data on industrial environmental pollution will be worked out.
- The final design of the EIS will be elaborated and the system will be programmed and integrated into the existing structure accordingly. The prototype will use data of several industrial sub-sectors assumed to be main polluters.

Result 2: Management Information Systems (MIS):

- Acquisition and development of MIS software is currently in process.
- Seminars on the introduction of the databases for SMEs in the two selected sub-sectors including user guidance will be organized for April and May 2006.
- Based on the data collected by the SMEs and complementary data, production process models will be worked out and integrated in the MIS.
- A package of activities is planned for distribution and implementation of the MIS at SMEs, including training activities carried out by local consultants (see result 3) and further guidance in practical application of the systems.

Result 3: Local consultancy services related to MIS:

- Suitable candidates (local consultants) for training measures will be identified and selected according to specific qualifications.
- Standard training specifications and suitable materials will be elaborated.
- Training measures will be conducted for local consultants in MIS for SMEs. Trainees will be evaluated and registered and suitable candidates for training of SMEs (see result 2) will be identified.

Result 4: Public Information Centre (PIC):

- A prototype version PIC will be designed, programmed and implemented, including integration with the EIS.
- Public promotion of the PIC (public announcement; seminars on usage of the PIC and interpretation and understanding of the published industrial environmental information for public key users considered as multipliers).
- Design and establishment of a system for continuous evaluation and improvement of the PIC.

Raw Interventions

None.

3.3.10 Allocation of Resources

	GTZ	DIW
<i>Project Management</i>		
• Project Manager and Coordinator	10.00 WM	24.00 WM
• Project Advisor	4.83 WM	
Totals:	14.83 WM	24.00 WM
Distribution:	38 %	62 %
<i>Implementation Personnel / Experts</i>		
• Governmental Officers		80.00 WM
• International Short-Term Experts	5.17 WM	
• Local Consultants	14.00 WM	
Totals:	19.17 WM	80.00 WM
Distribution:	19 %	81 %
<i>Supporting staff</i>		
• Secretary	15.00 WM	
Totals:	15.00 WM	
Distribution:	100 %	
<i>Monetary Contributions</i>		
• Training measures, seminars	109,000 €	
• IT equipment (hardware, software, database and interface programming); see note below	160,000 €	215,000 €
• Local travelling expenses for German staff	10,940 €	
• Office equipment	12,500 €	
• Running costs for office (materials)	8,250 €	
• Promotion of the project (TV broadcast)		4,080 €
Totals:	300,690 €	219,080 €
Distribution:	58 %	42 %
<i>Other Contributions</i>		
• Office equipment		√
• Local travelling expenses for DIW staff (flight ticket, hotel, daily allowance)		√
• Flight tickets for study trip to Germany		√
• Local transport		√
• Office space for the German Project Manager (20 m ²), the German Project Advisor (12 m ²) and the Project Secretary (9 m ²)		√

	GTZ	DIW
• Project meeting room (25 m ²)		√
• Two external telephone lines including costs		√
• IT infrastructure (Internet access, b/w laser printer, scanner) and photocopier.		√
• Office maintenance, electricity, air condition etc.		√

Note: It has been requested to shift approximately 100,000 € from the available budget for IT equipment to extend expert and local consultant assignments; approval by GTZ is pending.

3.4 Promotion of Environmentally Friendly Saa Paper

3.4.1 Partners

Department of Environmental Quality Promotion (DEQP) (counterpart), IPC1 (Industrial Promotion Center)

3.4.2 Duration

October 2005 to September 2007

3.4.3 SME Target Group

The target group or beneficiaries for this Project are the SMEs operating in this sector. The target group includes farmers, input suppliers, traders, exporters and supporting enterprises in the value chain. The SMEs are involved in production, processing of Saa paper into a variety of end products, and in the export of Saa paper. They are located mainly in the northern provinces of Thailand (Chiangmai, Chiangrai, Lamphu, Phrae and Naan provinces).

3.4.4 Aim and Relevance of the Project

The Thai Saa paper industry with approximately 50-70 million USD annual export value involves around 300 families that are engaged in the paper production and 5,000 families in value-added processing sectors. The business books 15-20% annual growth by exporting mainly to the EU, USA and Japan. Raw materials in pulp and/or raw bark form are imported by 80% from Laos and Burma. Five key stakeholders in the supply chain are raw material importers; SME Saa Paper factories; SME-like Saa paper communities; Saa paper processing communities; SME Saa paper exporters (and retailers).

The Saa market structure is facing several obstacles. In particular, chemicals used for boiling, bleaching and dyeing of the pulp has a negative environmental impact. Strong efforts are made to increase competitiveness through applying advanced and sustainable production methods and improve knowledge of the local people.

Main objective of this project is to increase the competitiveness of environmentally friendly Saa paper by introducing eco-efficiency. Eco-efficiency relates to the whole value chain from harvesting, gaining the raw material, the production to marketing. Competitiveness is defined by an improvement of productivity, business performance, innovation and environmentally sustainable production process.

3.4.5 Key Competitiveness Issues

Thai Saa paper is made of pulp from the mulberry tree (Ton Saa); it has become a regionally dominating export production during the last 20 years, whereas in earlier times it had been limited to local markets for traditional handicraft, like raw materials for umbrella and Buddhism inscription. The change was driven by mass production for tourist souvenirs and international importers, who benefit from low labour cost and improved design skill. The growth rate had been up to around 15-20% yearly. In the mean time, there is tough price competition from China, Nepal and The Philippines.

The project aims at increasing the competitiveness in the Saa-paper agro-business sub-sector by using a combination of enterprise productivity, business performance improving, product innovation and introducing eco-efficiency.

The sector shall be made competitive against current low cost offerings on the world market by higher productivity. This shall be achieved by reducing the cost per unit and/or increase return on investment by decreasing waste or non-product outputs. Loss in waste (e.g. loss by over- or undersized paper) is huge because there is no proper management concerning paper size and sheet production.

In general there is no proper sales organization or marketing department. The owner often is the salesman himself, and waits for occasional buyers. Only about six big producers have their own sales team and exhibit in international trade fairs. Having a better and strong network of producer / processors with a chance to exhibit in international trade fairs will improve business connections and increase the turnover. The project will support the stakeholders to participate in European trade fairs.

Thailand is still facing low pace in the product design. Only few companies submit their design to clients before getting orders. But main producers / processors are lacking of design style that can meet the clients' requirement.

An import market study will show the design lines and the market for environmentally friendly Saa-paper. Close network of buyers and producers will allow best timing of product launching.

The traditional pulp boiling method requires high-energy consumption (long period), and excessive chemical use. The project will introduce technologies (pressured boiler), which will be more energy-efficient and at the same time less harmful to the workers' health and the environment.

Thai Saa paper market relies by 20% on the domestic market. On the medium term, the Saa-paper production can no longer compete on the low prize segment; it rather shall become more competitive on the up-prized market. The project will support with this trend by "moving up the value-chain", introducing eco-efficient production practice, stimulating networking of stakeholders, understanding of environment oriented clients, improving the access to international trade fairs.

3.4.6 Status of Implementation

Introduction of PREMA to selected group

Thai Saa paper producers and processor are described as rather SME or SME-like entrepreneurs where the proper management of product and service are sub-standard. Huge environment impact and high cost cannot be avoided. Using eco-efficient principle through PREMA method, entrepreneurs will save their production cost and enhance the environment improvement.

Environment friendly production method: As part of project, DEQP has contracted University of Chiangmai to study on eco-efficient principle for Saa production. The study highlights production process; chemical use; relevant cost etc. as further implementation of first study, DEQP contracting University of Chiangmai to produce pilot pressured-boiler reducing pulp boiling time and chemical use. It proved the savings for energy and chemicals. 4 of such pilot boiler will be cost-shared by entrepreneurs.

Thai Saa Environment Standard: To allow sustainable business practices and as a tool for marketing, a committee for Thai Saa Standard on Environment. This committee consist of members from stakeholders agencies, namely Thailand Industrial Standard Institute (TISI), Department of Industrial Works (DIW), Department of Environmental Quality Promotion (DEQP), Municipality of Ton Pao, University of Chiangmai, University of Kasetsart and representatives of Saa Network groups. The committee is aimed at having valid accepted environment standard to be applied according to eco-efficient principle.

Set up of Network:

SME and SME-like entrepreneurs are located mostly in northern provinces of Thailand. Actually the small or community producers have no direct contact to exporters. It is then work of middleman or exporters who purchase Saa paper from processors or big wholesaler. Having a network for better access to information will improve state-of-art understanding on know-how, client's requirement. The networks are now being planned, and should be set up at province and district level, where the Saa paper is produced and processed. Periodically Network meeting will be organized. Network will enable the matchmaking between importers and producers and processors so that real requirement and market information are intact.

Colour Working Group:

Importers have been starting to be strict on chemical use where the hazardous risk must be zero. The fact is now almost all producers are using dying that is harming to humans. Cost of non-risk dying is

2-time higher price of conventional dying. Setting up of so called colour-working group, as a cooperative-like organisation will save costs. Working group will manage the purchase huge quantity from suppliers and retail to its members. Training on dying method and proper handling will be provided by the project together with dying suppliers.

Import Market Study:

Knowing the requirement of end users / importer requirement is key success to meet as such. A so called matchmaking between producers / processors and main importers of Germany will be organized. Such contact will allow product development and providing professionally time planning of stakeholders.

Participating in “Paperworld” Trade Fair:

A remarkable international market place for paper is Frankfurter Paper World, organised annually in January. The project is preparing the support of Thai SME to participate in the event in order to enable contacts to market requirement and display of creative handmade Thai Saa paper.

Raw Material Working Group:

Since 80% of raw materials (pulp and bark trees) are imported (75% from Laos and 15% from Burma). Less than 6 raw materials importers are controlling the import market. Minimum purchase is obviously a condition. This is a burden for SME to purchase directly such raw materials. As result, high cost and no quality guarantee are usual practices. Having working group of co-operative-like function as central purchasing unit of selected factory group will reduce the cost and at the same time guarantee of raw pulp and bark trees.

3.4.7 Status of Interventions

Completed and ongoing interventions

Introduction of PREMA to selected target group

Ahead of Implementation Arrangement signing, GTZ and DEQP has introduce PREMA: Profitable Environment Management training to 8 selected SME and SME-like communities starting in August 2005 and ended in January 2006. The training is successfully conducted as follow:

- 1 introduction workshop held on 21. June 2005
- Entrepreneur Module Training “ GHK-Good Housekeeping” and Factory Walk-Through during 7-8 July 2005
- Entrepreneur Module Training “ EoCM-Environment Oriented Cost Management” during 20.-21. September 2005
- 4 Monthly Network Meetings for participants: 27. July 05 / 17. August 05; 12.-13. October 2005 (including factory walk-through); 11. November 2005

All 8 PREMA participants delivered totally 30 Success Stories on their implementation of eco-efficient principles to reduce costs and enhance environmental improvement. All success stories and PREMA concepts were exhibited during last “Thai Saa Fair Festival”, held in Chiangmai during 24.-25. February 2006. Awards for outstanding performances were handed to participants during Thai Saa Fair Festival. Currently the project is planning to introduce PREMA to Saa paper network in Phrae and Naan provinces.

Environmentally Friendly Production Method:

DEQP contracted University of Chiangmai for a baseline study on applying eco-efficient principles through CT technology to Saa production. The second contract had been assigned to University of Chiangmai in July 2005 for set up of Pilot pressured-boiler. The boiler is constructed with a set up at 4 selected factories in May 2006. Further analyses for boiler mass production is planned for December 2006.

Networking:

First preparation meeting for set up of the network in Thai Saa paper is held on Feb. 2006 / in Phrae province / 32 participants and on 17. Feb. 2006 / in Naan province / 38 participants. In both meetings there are representatives of Industrial Promotion Center I (Chiangmai); DEQP; Municipality of Ton

Pao; local Administrative Assembly; Provincial Community Development Office; University of Chiangmai. Both meetings selected its working group with its leaders to set up an action plan on applying eco-efficient principles and coordinate with the project. Subject of meeting were: Set up of network; colour working group; Saa Standard; Network Committee; Raw Mat working group. Details of action plan will be submitted to the project in April. Next network meeting is planned in May 2006.

Colour Working Group:

Meeting with local private dying supplier was held in February 2006. First meeting of working group is planned in May 2006. Aim is to use non-hazardous dying in Thai Saa paper replacing the current harmful colouring method. Working shall procure dying in huge bulk for distribution among members. Private supplier are confirmed to meet in May for preparation of a training.

Raw Material Working Group:

Due to the fact that 80% raw mat are imported, the project plans a brainstorming workshop on raw material management in May 2006 in Laos PDR. Representatives of stakeholders: Ton Saa (Mulberry tree) collectors, importers, producers are participants. Conclusion of workshop will serve as action plan to secure quality and reasonable cost of raw mat supply.

Planned interventions

The project is actually (March 2006) revising and up-dating its plan of operation. Actual planned interventions by now focus on the conceptual and organizational design of possible facilities like Saa paper bank, paper colour bank, paper standard board, paper raw material bank, eco-efficiency support centre. Beside this, the participation at the paper world fair in Frankfurt (Jan. 2007) is being prepared.

3.4.8 Allocation of Resources

Contributions Personnel	GTZ	DEQP
Management		
• Project Director	4 wm	4 wm
• Sector managers, regional coordinators	24 wm	24 wm
Implementation Personnel		
• Govt. Officers (C4-C7)	-	24 wm
• Intermediate, short term experts (backstopping, sector manager business, financial services)	6 wm	-
• Support Personnel	-	6 wm
Totals	34 wm	58 wm
Percentages	37	63
Contributions In-kind (in BHT)		
• Office accommodation	-	-
• Computer, fax, phone	-	-
• Transport	-	50,000
• Electricity/ Water	-	50,000
• Maintenance	-	50,000
• Photocopying	-	50,000
Totals	-	200,000
Percentages	-	100
Contributions, to be calculated thru project (in BHT)		
Project Management:		
• Computers, fax, phone	-	-
• Consumables and office costs, rent	80,000	-
• Travel and accommodation (in country)	200,000	300,000
• Project personnel	-	100,000
• General studies	-	-
• Training/ Study tours/ Overseas trip	1,000,000	200,000
Interventions		
• Short term experts, consultants	800,000	-
• Specific studies (outsourced)	1,000,000	2,500,000
• Other intervention costs (exhibitions, workshops, promotion material, facilities, exchange programme, internships)	2,000,000	700,000
Totals (cash and in-kind)	5,080,000	4,000,000
Percentages (cash and in-kind)	56	44

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