No. 1

JICA VIETNAM OFFICE

REPORT ON EX-POST EVALUATION STUDY

AFFORESTATION TECHNOLOGY DEVELOPMENT PROJECT IN ACID SULPHATE SOIL IN THE MEKONG DELTA IN THE SOCIALIST REPUBLIC OF VIETNAM

HANOI, DECEMBER 2006

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PREFACE

During the period from March 1997 ~ March 2002 including follow-up period, Japan International Cooperation Agency (JICA) assisted Vietnam in implementing the "Afforestation Technology Development Project in Acid Sulphate Soil in the Mekong Delta in the Socialist Republic of Vietnam".

Three years after the project completion, JICA conducted an "Ex-post evaluation" to assess the impact and sustainability of the project through the Vietnam Forest University. This report has been finalized as a result of the study.

Taking this opportunity, I would like to express my sincere thanks for the cooperation of consultant team of the Vietnam Forest University, staff members of the Forest Science Sub-Institute of South Vietnam and others who cooperated in this report. I hope this report would be of good reference for the implementation of future projects in this area.

Hiroaki NAKAGAWA
Resident Representative
JICA Vietnam Office

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Abbreviations

DARD	Department of Agriculture and Rural Development
FSSIV	Forest Science Sub-Institute of South Vietnam
JICA	Japan International Co-operation Agency
PDM	Project Design Matrix
R/D	Record of Discussions
TOR	Terms of Reference
USD	United States Dollar
VND	Vietnamese Dong

Third Party Review by External Experts

Afforestation Technology Development Project in Acid Sulphate soils in Vietnam

Comments

Concerning to the significance of the project, it appears that the project met a need identified by the Government of Vietnam and the funding agency. .

Concerning to the success of the project, it appears that successful models were developed. However, there was impact on the economic viability due to a decrease in the price of wood. However, there are questions as to the sustainability of the project activities.

However, there is one concern relating to the environmental impact of the draining of "wastelands" for the production of rice and wood. Often these areas are wetlands that are productive. This issue does not appear to have been addressed in the evaluation. Perhaps it was part of the initial project design.

Concerning to the evaluation process, the evaluation report appears to be comprehensive and sound.

Bernard O'Callaghan
Designation: Programme Coordinator
Name of the institution: IUCN Vietnam

Ex-Post Evaluation on ... Afforestation Technology Development Project in Acid Sulphate soils in Vietnam

** This Third Party Review by External Experts is to examine the end-product (an evaluation report and a summary sheet) of ex-post evaluation of the above-mentioned project in light of its structure, verification procedure and overall consistency. It is to be noted that the review is not to question the validity of the evaluation results per se.*

** On the leftmost column of each item, choose the rating from A as 'excellent', B as 'good', C as 'acceptable' and D as 'unacceptable'.*

** When you choose D for an item, specify the reason in comment fields.*

** For more details of viewpoints for each item, refer to the corresponding page of 'JICA Project Evaluation Guideline' which is indicated on the rightmost column of each item.*

1 Evaluation Framework

		Reference page No. of 'JICA Project Evaluation Guideline'
B	(1) Time Frame of Evaluation Study	97
Viewpoint	Necessary field survey activities such as data collection and discussion with counterparts are appropriately set within the time frame of the evaluation study. Time frame also contains preparations such as distribution of questionnaires, and are appropriate in terms of timing, length and schedule of the evaluation study.	
B	(2) Study Team	107
Viewpoint	Team members are assigned on a impartial basis, and are with balanced specialty.	
Comment	The team was very experienced. All experts were from Forestry University. Perhaps some diversity in the team may have improved differing points of view.	

2 Date Collection and Analysis

B	(1) Evaluation Questions	51
Viewpoint	Evaluation questions are in line with evaluation purposes and set properly in the evaluation grid. General questions as to the five evaluation criteria are narrowed down to more specific sub questions to identify necessary information/data to be collected.	
B	(2) Data Collection	72
Viewpoint	Data collection is conducted based on the evaluation grid, and is sufficient for obtaining answers for evaluation questions. Additional information are collected for unexpected and newly confronted questions during the process.	
B	(3) Measurement of Results	61
Viewpoint	Achievement level of overall goal is examined on the basis of appropriate indicators, being compared with targets.	

B	(4) Examination of Causal Relationship	62
Viewpoint	The causal relationships whether the effects for the beneficiaries resulted from the project is examined either in a qualitative or quantitative manner (i.e. Are the effects at the overall goal level caused by the project intervention?)	
Comment: The evaluation mission appears to have addressed the issues of the evaluation mission		

3 Evaluation Results

B	(1) Impact	57, 85-86
Viewpoint	Perspectives for evaluation of 'Impact' (e.g. achievement level of the overall goal, causal relationships between the outcome of the project and overall goal, ripple effects) are substantially covered. Grounds for judgment are clearly stated in a convincing manner.	
B	(2) Sustainability	58, 85-86
Viewpoint	Perspective for evaluation of 'Sustainability' (e.g. probability of activities to be continued and outcomes to be produced in terms of 1)policies and systems, 2) organizational and financial aspects, 3) technical aspects, 4) Society, Culture and environment and) are substantially covered. Grounds for judgment are clearly stated in a convincing manner.	
B	(3) Factors Promoting Sustainability and Impact	85-86
Viewpoint	Promoting factors on 'Impact' and 'Sustainability' are analyzed properly based on the information obtained through evaluation process.	
C	(4) Factors Inhibiting Sustainability and Impact	85-86
Viewpoint	Inhibiting factors on 'Impact' and 'Sustainability' are analyzed properly based on the information obtained through evaluation process.	
C	(5) Recommendations	87-88
Viewpoint	Recommendations are made thoroughly based on the information obtained through the process of data analysis and interpretation. Recommendations are specific and useful for feedbacks and follow-ups, preferably being prioritized with a time frame.	
B	(6) Lessons Learned	87-88
Viewpoint	Lessons learned are derived thoroughly based on the information obtained through the process of data analysis and interpretation. Lessons learned are convincing and useful for feedbacks, being generalized for wider applicability.	
Comment: In general the analysis is acceptable and covers key element of sustainability. It appears that the analysis has been conducted to a level that is considered as acceptable. One of the key issues remains as the financial sustainability as highlighted in the report.		

4 Structure of Report

B	(1) Writing Manner	89,103
Viewpoint	Logical structure and major points are clearly described in an easily understandable manner.	
B	(2) Presentation of Primary Data and Utilization of Figures	89,103
Viewpoint	Sufficient primary data such as on the target, contents and results of interviews and questionnaires are presented properly in the report. Figures and tables are utilized effectively to present statistics and analysis results.	
Comment: Solid and well written		

5 Overall Review based on 'Criteria for Good Evaluation'

B	(1) Usefulness	13-14
Viewpoint	In light of the effective feedback to the decision-making of the organization, clear and useful evaluation results are obtained.	
B	(2) Impartiality and Independence	13-14
Viewpoint	Evaluation is impartially conducted in a neutral setting	
B	(3) Credibility	13-14
Viewpoint	In light of the specialties of evaluators, transparency of the evaluation process and appropriateness of the criterion of judgment, evaluation information are credible.	
B	(4) Participation of Partner Countries	13-14
Viewpoint	Partner countries' stakeholders participate actively in the process of evaluation, not just provide information.	
Comment: Acceptable report with substantive recommendations		

5 Overall Comment

The report is comprehensive in nature and appears to be a reasonable review of the project, its outputs and provision of comments on the sustainability of the project activities.
The conclusions appear on the surface to be sound and logical. Additional identification of lessons learnt could contribute to the development and design of future activities.

Date: *October 27, 2006*
Name of the Third Party: *Bernard O' Callaghan*
Designation: *Program Coordinator*
Name of the Institution: *UCN – Vietnam*

EXECUTIVE SUMMARY

1. Outline of the Project		
Country: *Vietnam*		**Project title:** Afforestation Technology Development Project in Acid Sulphate Soil in the Mekong Delta in the Socialist Republic of Vietnam.
Issue/Sector: Forestry		**Cooperation scheme:** *Project-type Technical Cooperation*
Division in charge: JICA Vietnam Office		**Total cost: 1,372,368 USD** **(Operational, equipment and material cost)**
Period of Cooperation	*March 1997 ~ March 2000* *March 2000 ~ March 2002 (Follow-up)*	**Partner Country's Related Organization(s):** Forest Science Sub-Institute of South Vietnam (Phân viện Nghiên cứu Khoa học Lâm nghiệp Nam Bộ)
		Supporting Organization in Japan:
Related Cooperation		N/A

1-1. Background of the Project

About one third of the Mekong Delta (1.6 million hectares) is covered with acid sulphate soils, which have not been used for agriculture and forestry. In the past, about a half of the acid sulphate soil area was covered by Melaleuca forests. As Melaleuca trees tolerate soil acidity and are able to withstand flooding, Melaleuca appears to be the most suitable species for the reclamation of wasteland where agricultural production is unsuitable. The reclaimed wasteland is aimed for settling landless farmers to engage in agroforestry in Thanh Hoa District, Long An Province. For this reason, the Vietnamese government submitted a request to the Japanese government for Project-type Technical Cooperation.

1-2. Project Overview

The Project aims at developing practical techniques of soil improvement, plantation and nursery as a result of experiments conducted in the project site in Thanh Hoa District, Long An Province. During Project period (1997-2000), JICA have supplied equipments for afforestation research and practice such as computer, atomic absorption photometer, earthmover, tractor, pump etc. to FSSIV(Forest Science Sub-Institute of South Vietnam) and dispatched experts to transfer technology in researching techniques for Soil Improvement, Selection of Tree Species, Nursery and Care, Environment monitoring and Editing Manual for Afforestation, etc. Due to uncompleted experiments, the project was extended for 2 more years of the follow-up period (2000-2002).

(1) Overall Goal

To promote effective and sustainable use of unutilized land with acid sulphate soils in the Mekong Delta for forestry and agriculture.

(2) Project Purpose

To develop practical afforestation technology for the land with acid sulphate soils in Thanh Hoa (former Tan Thanh) area, Long An province.

(3) Outputs

i) Developed soil improvement technologies for acid sulphate soils in Thanh Hoa area
ii) Selected tree species adaptable to acid sulphate soils in Thanh Hoa area
iii) Developed technologies of nursery practices and care for tree species adaptable to acid sulphate soils in Thanh Hoa area
iv) Proposed methods to mitigate negative effects on surrounding environment caused by leaching of harmful substances from acid sulphate soils
v) Produced appropriate guidelines of afforestation technologies for acid sulphate soils
vi) Established demonstration forest on acid sulphate soils.

(4) Inputs (as of the Project's termination)

Japanese side:

Long-term Expert: 12 — Equipment (FY 1997-99): 92 million Yen
Short-term Expert: 15 — Local cost (FY 1997-99): 72 million Yen
Trainees received: 10 — Others: Dispatched experts, counterpart training in Japan, dispatched missions

Vietnamese Side:

Land at Thanh Hoa Experiment Station
Office and Facilities at FSSIV
Local Cost: 1,172 mil VND (8.8 million Yen)

2. Evaluation Team		
Members of Evaluation Team	Nguyen Nghia Bien, Vietnam Forestry University (VFU), Team leader Tran Ngoc Hai, VFU Trinh Quang Thoai, VFU	
PERIOD OF EVALUATION	13/02/06 – 15/03/06	**Type of Evaluation:** Ex-post Evaluation

3. Results of Evaluation

3-1. Summary of Evaluation Results

(1) Impact

The overall goal of the JICA-FSSIV Technical Cooperation Project for Afforestation Technology Development on Acid Sulphate Soils in the Mekong Delta has been met.

In technical and environmental terms, the project has contributed to a dramatic increase in the area of forests and Melaleuca plantations within and outside the project area. For instance, forest area within the project area has increased from 27 ha in 1997 to 686 ha in 2005. Respectively, these figures are 9,000 ha and 19,198 ha in Thanh Hoa district. The project has also contributed to a change in forest tree and agricultural crop patterns such that more species have been introduced by and as a result of the Project. The quality of soils in forest plantations is likely to be improved, although this change can only be measured in qualitative data. Moreover, local biodiversity is improved with more species, both fauna (birds, honeybee) and flora (vines) appearing.

One of significant impacts of the Project is expressed by the fact that afforestation technologies developed by the Project such as seedling and nursery technique, embankment land preparation, and potted and bare root planting have largely spread and adopted by farmers/forest growers within and outside the project area. These technologies are being introduced in other provinces of the Mekong Delta such as Ca Mau.

Thus, based on above-mentioned facts, it can be assured that overall goal was achieved thanks to technologies and skills necessary for promoting effective and sustainable use of utilized land in the Mkong Delta.

In socio-economic terms, the project has contributed to create a large area of Melaleuca forests which result in an excess of timber supply over its demand in the Project area. Although the price of Melaleuca timber is dropping, local farmers' income can be secure if Melaleuca trees can be used for other purposes, let's say for extracting oil, making woodchips, furniture, charcoal, etc. The Project-made infrastructure (roads, canals) on the other hands has given a great contribution to improving local transportation, particularly during flooding period, and hence living conditions of local people living in the project area.

In terms of creating jobs for local people, more hired labour is required to undertake forestry and agricultural activities such as embankment making, planting, tending and harvesting, thanks to afforestation technologies developed by the Project. Another impact of the Project is valued in terms of attracting people from surrounding locations to invest in forestry and agricultural production.

(2) Sustainability

The technical sustainability of the project is obvious. Afforestation technologies developed by the project such as land preparation (embankment making), seedling production, planting, tending and pest control are continuing to be used within and outside the project area by farmers/forest growers and other projects. It is estimated that around 800 farmers in Thanh Hoa District had been trained in afforestation technologies on acid sulphate soils, 70 percent have already applied embankment and ditch making techniques. The remaining has not yet applied these due to a high cost (about VND6 million per hectare). The model of planting Melaleuca cajuputi VN on embankments is also employed in other ecological regions such as semi-flooding areas of Hoa Binh and Thac Mo Hydroelectricity Dams while embankment and bare root planting are being introduced to new conditions by the post-fire forest rehabilitation project in Ca Mau Province. The adoption of techniques such as planting Melaleuca leucadendra on embankments and potted seedling and scion cutting production however is limited due to a high cost of operation.

The organisational sustainability of Project is expressed by the continuity and spread of technological transfer network and activities after the Project finished by FSSIV, provincial departments in the Mekong Delta, local agriculture-forestry, DARDs, modelled farmers and through study tours. The sustainability is also confirmed by the FSSIV ability to continue their technological transfer, research and project-related activities such as progeny test, processing of oil, charcoal, wood chipboards, growing fungus on Melaleuca timber and coppice regeneration. FSSIV is maintaining free advisory services to local farmers and implementing consultancy contracts with large-scale farms and other projects. Other post-project activities such as progeny test in the nursery and monitoring of annual forest growth are also maintained and reported annually to FSSIV by Project stakeholders such as local agriculture-forestry extension staff and successful farmers. The environmental monitoring of change in water and land quality and meteor-hydrological conditions however is not kept on. As a result, final conclusions on how environmental quality in the project

area has changed have not yet been reached.

The financial sustainability of the Project, however, is subject to a big concern. It is reflected by the fact that a limited access to market for local timber may lead to rejection of planting Melaleuca species in the area and further application of technologies developed by the Project for these species. Besides, a shortage of financial resources for maintaining FSSIV activities such as review and evaluation of project-induced technological models, repair and maintenance of machines and equipments, buildings, roads and so on may affect the sustainability of the project effects.

3-2. Factors that have promoted project

(1) Impact

One of the factors that contribute to achieving the expected impacts of the Project is JICA support to the project which is highly appreciated in terms of timeliness, quantity and quality and met requirements. Another factor is referred to the team of short-term experts who are highly qualified and able to solve emerging problems quickly. The next factor is that the Project objectives are in line with local authority's strategy and are adopted and supported by local authority and people. Further, the outcomes of the Project are suitable to local physical conditions and hence become easily disseminated. The enthusiasm, dynamics and qualification of Vietnamese staff have also made a huge contribution to the Project success.

(2) Sustainability

The first factor is linked to local physical conditions that are suitable for Melaleuca species to grow. The second factor is the contribution of local farmers' experience to developing of afforestation technologies and guidelines which makes them easily adopted by farmers/forest growers within and outside the project area. The right selection of highly qualified expatriate experts and appropriate domestic personnel for project implementation is important.

(3) Others: N/A

3-3. Factors that have inhibited project

(1) Impact

The first factor that inhibits expected impacts of the Project is a divergence in durations of the Project and forest rotation. This results in inadequate monitoring and evaluation of project activities. Second, investment in several equipments such as meteor-hydrological station did not include training of personnel and transfer of technology. Finally, physical conditions such as seasonality also affect the success and progress of several project activities.

(2) Sustainability

The factors that may hinder the sustainability of the project are various. First of all, a risk of forest fire during the dry season is a big concern for forest growers and managers. Secondly, the existing wage payment system applied to the Vietnamese staff has not been consistent with the Project works undertaken. Lack of financial resources for evaluation and documentation of on-going research and post-project activities can be interpreted that these achievements of the project may not be used in the future and hence hinder continuing spread of the project effects. Thirdly, a number of personnel trained by the Project had moved to other units/positions, causing an under-use of these trained staff. Further, consumption of Melaleuca timber may be adversely affected by its less diverse and low-value products.

(3) Others

Market access for timber and high cost of machinery land preparation are also important factors inhibiting the sustainability of the project.

3-4. Conclusion

The overall goal of the JICA-FSSIV Technical Cooperation Project for Afforestation Technology Development on Acid Sulphate Soils in the Mekong Delta has been met. After completion, the Project has still had large impacts on agriculture and forestry development within and outside the Project area, changing plant/crop patterns in the project area, and causing a great spread of afforestation technologies to many other locations outside the Project area. The social impact of the Project is also vital in terms of improving production and living conditions and creating jobs for local inhabitants.

The technical sustainability is obvious in terms of continuous dissemination and spreading out the outcomes of the Projects, that is afforestation technologies and demonstration models. The economic sustainability of the project, however, is questionable given that the market for timber from local forests is limited and a higher profit from agricultural crops leads to replacement of the former with the latter. A lack of financial resources for maintaining on-going activities after the Project completion may hinder the sustainability of the project impacts.

3-5. Recommendations

It is recommended that the following aspects be considered, namely: i) studying in the market for Melaleuca timber and its related products; ii) continuing research into the quality and properties of Melaleuca timber for further processing; iii) improving technologies for coppice regeneration and large-size timber of Melaleuca species; iv) conducting research into forest fire control in Melaleuca forests; and v)

linking research into Melaleuca tree development to regional planning.

Financial resources need to be carry out market survey, research into Melaleuca timber properties and its processing possibilities (e.g. oil extraction, wood-chip board, wood-based panel, etc.), study of economic efficiency of Melaleuca timber growing, maintaining project machines and equipments and improving project infrastructure (e.g. roads, canals and office building), and training in new fields related to successive activities. Financial needs can partly be covered by an income from selling mature Melaleuca trees created by the Project.

3-6. Lessons learnt

An integrated approach is essential for project design to consider not only project activities and their associated inputs, but also project-induced outputs. Next, modern land preparation methods using expensive machines are technically appropriate but financially unsuitable for local farmers/forest growers who are mostly poor. A short project length and a long forest rotation may lead to difficulty in evaluation of how afforestation technologies would be useful and effective.

3-7. Follow-up Situation: N/A

1. Outline of the Ex-post Evaluation Study

1.1. Project Overview

Background

About one third of the Mekong Delta (1.6 million hectares) is covered with acid sulphate soils, which have not been used for agriculture and forestry. In the past, about a half of the acid sulphate soil area was covered with Melaleuca forests. As Melaleuca trees tolerate soil acidity and are able to withstand flooding, Melaleuca appears to be the most suitable species for the reclamation of wasteland where agricultural production is unsuitable. The reclaimed wasteland is aimed for settling landless farmers to engage in agroforestry in Thanh Hoa District, Long An Province.

The JICA-FSSIV Technical Cooperation Project [1] for Afforestation Technology Development on Acid Sulphate Soils in the Mekong Delta (hereinafter referred to as "the Project") was lasting for three years, from March 1997 to March 2000. The Project aimed at developing the practical techniques of soil improvement, plantation and nursery as the results of experiments conducted in the project site in Thanh Hoa District, Long An Province in order to promote effective and sustainable use of unutilised land for forestry and agriculture on acid sulphate soils in the Mekong Delta.

During the Project period, JICA have supplied equipments for afforestation research and practice such as computer, atomic absorption photometer, earthmover, tractor, pump etc. to FSSIV and dispatched experts to transfer technology in researching techniques for Soil Improvement, Selection of Tree Species, Nursery and Care, Environment monitoring and Editing Manual for Afforestation, etc.

On the other hand, the technical guidelines have been prepared as tools for the staff of FSSIV to transfer the developed techniques to the provincial personnel who are responsible for forestry development and protection in the Mekong Delta. After the 3-year period of implementation, several experiments were not completed. The Project therefore was extended by a 2-year follow-up period.

[1] Technical cooperation projects are one of JICA's main types of overseas activities. They are results-oriented, with Japan and a developing country pooling their knowledge, experience, and skills to resolve specific issues within a certain timeframe. The projects may involve the dispatching of experts from Japan to provide technical support, invitation of personnel from developing countries for training, or the provision of necessary equipment.

Project area

The Project area was located in Thanh Hoa District, Long An Province, about 70 km west of Ho Chi Minh City. The climatic conditions in the Project area are differed in two seasons: the rainy season lasts from May to November and the dry season – from December to April of the next year. The area is characterised by a canal network whose water level varies according to particular seasons. For instance, the canal water is scarce and affected by tides during the dry season while it spills over by floods during the rainy season.

The total area of 780 ha was allocated to FSSIV by the Long An People's Committee. Within this, about 240 ha are used for creating experimental and demonstration forests. The remaining area is reserved for settling landless farmers who are engaged in agroforestry.

Partner Country's Implementing Organization

The counterpart agency is the Forest Science Sub-Institute of South Vietnam (Phân viện Nghiên cứu Khoa học Lâm nghiệp Nam Bộ). It has the main office in Ho Chi Minh City and different experimental stations in other provinces. One of its stations is Thanh Hoa Experimental Station in Long An province where the project area is located.

Project framework

The Master Plan of the Project is shown in Annex 1 – Logical Framework.

1.2. Objective of the Study

The objectives of this ex-post evaluation are:

1) to extract lessons-learned and recommendations to improve future JICA planning and, implementation capacity of the implementation Agencies;

2) to meet the accountability to the Japanese tax payers.

These two objectives are achieved respectively through evaluating mainly the impact and the sustainability of the selected project; and through producing reports in both electronic and printed forms.

1.3. Member of Evaluation Team

1.3.1. Member from JICA's side

- Mr. Nguyen Nghia Bien, Vietnam Forestry University, Team Leader
- Mr. Tran Ngoc Hai, Vietnam Forestry University, Researcher
- Mr. Trinh Quang Thoai, Vietnam Forestry University, Researcher

1.3.2. Member from FSSIV's side

- Mr. Vu Dinh Huong, Former Head of Thanh Hoa Station, 1998-1999.
- Mr. Kieu Tuan Dat, Former Head of Thanh Hoa Station, 2000-2005.
- Mr Ngo Van Ngoc, Head of Thanh Hoa Station since 01/2006.

1.4. Schedule of the Ex-post Evaluation Study

The Ex-post Evaluation Study takes place for a 4-week duration and is operationalised as follows:

Activities	Commencement	Completion
Questionnaire design/Preparation for the field work	13/02/2006	18/02/2006
Travel to HoChiMinh City	19/02/2006	19/02/2006
Fieldwork	20/02/2006	24/02/2006
Travel to Hanoi	25/02/2006	25/02/2006
Data analysis	26/02/2006	28/02/2006
Draft report writing	01/03/2006	06/03/2006
Supplemental survey/finalizing report	07/03/2006	15/03/2006

2. Study Methodology

2.1. Source of Information

Sources of information used for ex-post evaluation purposes are various including

primary and secondary data. Primary data and information are obtained from relevant Project stakeholders such as FSSIV/Thanh Hoa Station leaders and staff, local staff from ThanhHoa District, ThanhHoa District Forest Protection Division, ThanhHoa Forest Enterprise and local farmers/forest growers. Secondary data and information are obtained from different Project and other related documents such as R/D between the Japanese side and the Vietnamese counterpart, Minutes of Discussions on the Japanese Technical Cooperation for the Project, Minutes of Meeting on the R/D, etc. Secondary data and information are also gathered from Project final report, Project terminal evaluation report, monitoring reports and so on. A great amount of information on the current conditions of FSSIV and on-going achievements in disseminating afforestation techniques developed by the Project is also collected for further analysis.

Besides, the current situation of forests planted thanks to the Project impact at different locations within and outside the project area is an obvious source of information on the extent to which the Project has affected local forestry development.

2.2. Study Methods

As this study mostly aims to evaluate the impact and sustainability of the project as well as the contributing and/or inhibiting factors, a various tools/techniques were employed during the evaluation process (see also the Evaluation Grid in the Annex 2 for more details).

In the data and information collection stage, methods/techniques such as questionnaire, semi-structured interviews, discussions, field observation and literature review were used. To collect primary data, a questionnaire was developed in two separated forms for interviewing local farmers and FSSIV personnel/local staff. To avoid yes/no answers, semi-structured interviews and discussions were widely employed to ease the information collection process, particularly when local farmers were involved. Field observation at different sites including the Station's experimental forests, demonstration forests, local farmers' forests and agricultural field within and outside the Project area is a effective way to cross-check the information gathered from different stakeholders. Moreover, *in-situ* discussions on various issues also took place during the field observation, supported by the taken photos. For secondary data, the literature review technique was applied.

In the next stage, an in-depth analysis of the information collected was carried out to evaluate the impact and sustainability of the Project as well as the factors that are contributing to and/or inhibiting the achievements of the Project. The analysis covers not only both quantitative and qualitative data collected, but also comparison of the situation of the project area before and after the Project, if possible.

Given the evaluation objectives pinpointed in the TOR for this ex-post evaluation, a multi-disciplinary evaluation team was formulated including members with different backgrounds. Almost every point to be evaluated was discussed and agreed upon by the team members. As requested by JICA Vietnam Office, a draft ex-post evaluation report is sent to both JICA and FSSIV for comments. Based on these comments, the draft report is revised and/or amended to be the final report.

3. Evaluation Results

3.1. Impact of the Project

3.1.1. Impacts Attained at the Overall Goal level

In terms of project impact, the evaluation mission primarily focuses on finding the answer for the question: *With equipment provided and technique transferred to FSSIV, to what extent had the Project contributed to promote effective and sustainable use of unutilized land with acid sulphate soils in the Mekong Delta for forestry and agriculture?* In other words, the mission attempts to evaluate the degree of project impact in technical/ environmental, social and economic terms after the completion of the Project.

The most obvious impact of the project has been attained in technical and environmental aspects and can be verified by the following indicators:
i) *dramatic increase in the area of forests and Melaleuca plantations within and outside the project area*. Before 1998, of 780 ha of the project area, only 2 ha were used for experimental forests, 25 ha were planted with eucalyptus. After the Project finished, 210 ha were rehabilitated and used for experimental and demonstration forests, 260 ha of settlement area and 216 ha of Project 661 were rehabilitated using technologies developed by the project.

In Thanh Hoa District, the Melaleuca forests amounted for about 9,000 ha in 1997

(before the project). This area has increased to 14,114 ha in 2002, 16,376 ha in 2003, 18,298 ha in 2004 and 19,198 ha in 2005 as a result of the Project achievements in developing appropriate afforestation technologies on acid sulphate soils.

ii) *the quality of soils in forest plantations is likely to be improved*. This occurs as a result of decomposition of dropped leaves/litter of forest trees which contributes to increase in soil organic matter. In fact, many households including the interviewed farmers have grown crops such as rice, water melon and winged yam (*Dioscorea kratica Prain*) after harvesting Melaleuca without additional fertilization (Photo 1).

Photo 1. Melaleuca and winged yam on embankments

iii) *change in forest tree and agricultural crop patterns such that more species have been introduced as a result of the Project*. Before 1998, Melaleuca cajuputi VN was a dominating species in local forests. Recently, the area of Melaleuca leucadendra which is introduced by the Project has increased because of its advantage in terms of rapid volume increment. In addition to previously existing crops such as rice, winged yam, pineapple and water melon, other species like *Carchorus capsularis*, grape fruit, longan, jack fruit and cassava can grow well on high embankments as a result of the technologies developed by the Project (see Photo 2).

Photo 2. Grape fruit trees growing on high embankments

iv) *local biodiversity is improved with more species appearing*. These include birds and honeybees. Birds are observed more during the flooding season. Natural regeneration of Melaleuca cajuputi VN and indigenous Melaleuca is also observed around embankments while coppice regeneration of Melaleuca cajuputi VN and Melaleuca leucadendra takes place on embankment plantations. Some vines such as *Passiflora hispida*, *Lygodium scandens* and some weeds have occasionally been observed in Melaleuca forests (see Photo 3).

Photo 3. *Passiflora hispida* climbing on Melaleuca trees

v) *afforestation technologies developed by the Project have largely spread and adopted by farmers/forest growers within and outside the project area*, as follows:

- Seedling and nursery techniques developed by the Project are advancing and play an important role in supplying seedlings for local forest plantations. At Thanh Hoa Experimental Station, seedling technology has changed from potted seedling production to cutting and tissue culture techniques. Most agriculture/forestry extension workers in Thanh Hoa District and a great number of agriculture/forestry extension workers in other provinces in the Mekong Delta were trained in afforestation technologies. This trained staffs have continued to train other farmers through training courses using the guidelines/brochures developed by the Project in either full or shortened versions. Since the Project finished, 8 such courses were conducted in Thanh Hoa District. A significant impact of seedling and nursery techniques that the Project brought to local farmers can be explained by the fact that local farmers are changing their habit of forest plantation from direct seed sowing to using bare root seedlings for planting on embankments.

- Land preparation and plantation models developed by the project have affected the way of forest plantation traditionally used by local farmers. Recently, most of forests in Thanh Hoa District are growing on embankments as a result of learning from the Project demonstration forest model. Local farmers however mostly prepare embankments manually due to a high cost of machinery rental. The most widely used method is planting individual Melaleuca on 6m-wide embankments with 1.2m-wide and less than 0.7m-deep ditches and spacing 0.7m x 0.7m.

Another important impact of the Project is expressed in socio-economic terms. First, the forest area increased thanks to the project contribution becomes such large that is able to supply a great amount of Melaleuca timber (mainly used for construction such as strengthening foundations) to meet its demand. Currently, it is estimated that the supply of Melaleuca timber excesses the market demand, resulting in a drop of timber price. The income of many households from Melaleuca timber therefore decreases. For instance, the income from one hectare of Melaleuca constituted about VND50 million before the Project. It currently amounts for only VND18-20 million. The dropping income forces local farmers to clear the existing forests and replace with more profitable crops such as winged yam and water melon. This dilemma is further analyzed in the next section below. The project-induced forests, however, bring a chance of obtaining income from other by-products such as Melaleuca oil, charcoal and honeybees.

The Project-made infrastructure includes a 10-tonne capacity bridge, a 3-km asphalt road, 2.5-km internal track and 10-km drainage canals. This infrastructure has given a great contribution to improving local transportation, particularly during flooding period, and hence living conditions of local people living in the project area. Thanks to this infrastructure, local farmers in the project area are able to sell their timber and agricultural products easily without losing to middle men.

The impact of the Project can also be evaluated in terms of creating jobs for local people. Thanks to afforestation technologies developed by the Project, more hired labour is required to undertake forestry and agricultural activities. From 1997 to 2005, about 10,000 more hectares of Melaleuca have been created. Steps including embankment making, planting, tending and harvesting Melaleuca are mostly undertaken by hired labour. Wage rates vary according to particular works done. For instance, a daily rate of 40,000VND is paid for embankment making, planting and tending, 2,000VND is paid for harvesting one tree and 200VND is paid for loading/unloading a Melaleuca tree. As a result of the Project-induced forest development, several timber chains have been formulated and played an important role in commercializing the redundant local timber. For example, Sau Toan Timber Trade Entrepreneur at Thanh Hoa District sells about 300,000 Melaleuca trees annually to the main markets in Long An Province and Ho Chi Minh City. The business of the entrepreneur creates about 40-50 jobs and pays a tax of 20-25 VND millions to the District annually.

Another impact of the Project is valued in terms of attracting people from surrounding locations to come to invest in forestry and agricultural production. Although the decrease in Melaleuca timber price is not in favour of small-scale forest growers, it is still accepted by large-scale forest growers due to economies of scale. That is why while many farmers having small land area have a tendency to replace Melaleuca plantations with agricultural crops, large-scale farmers still keep on investing in Melaleuca planting. The change in crop pattern however can be used to explain positive impacts of the Project such that improved quality of soil after afforestation is suitable for many agricultural crops to grow which can also ensure an alternative income for local households.

In terms of institutional impact, the Project has established a good relationship with local authority and community through various activities such as: supporting local

primary schools to propagandise the role of forests in the region; increasing local people's awareness of the role of forests in environmental protection and income security. A good cooperation has also made between Thanh Hoa Station and local authority in controlling and fighting against forest fire and diseases.

3.1.2. Impact not Anticipated at Project Completion

Besides the impacts that are anticipated to be brought by the Project, there have been a number of impacts that are not anticipated at the Project completion. The latter includes both positive and negative ones.

The un-anticipated positive impacts are numerous. First, as a result of the Project, Melaleuca plantation activities have taken place on a large scale. Indeed, the current area of Melaleuca plantation in Thanh Hoa District (see above) is such large that the District has to adjust this area to 16,000 ha in 2010. In other districts of Long An province, Melaleuca forests recently created using afforestation technologies of the Project are also increasing. This leads to an excess of Melaleuca timber supply over its demand, causing a drop in timber price, as mentioned earlier.

Second, the dissemination of the Project-induced afforestation technologies, particularly land preparation methods and planting models, has spread much faster and larger than expected to locations not only within Long An province but also in other provinces in the Mekong Delta such as An Giang, Kien Giang and Ca Mau. In this context, farmer-to-farmer extension plays an important role in spreading the impacts of the Project to other locations. The techniques of embankment making, potted and bare roots planting are widely used and Melaleuca leucadendra is also largely introduced in these provinces.

Third, the change in purposes of land use after rehabilitation takes place because the quality of soil is likely improved after planting Melaleuca forests and becomes suitable for growing other agricultural crops such as rice, winged yam, water melon and fruits.

Fourth, the Project results in a number of new directions in researching, processing, using and consuming potential products from Melaleuca trees such as charcoal, extracted oil, wood-chip board, bee honey, etc. other than a sole timber for construction.

The un-anticipated negative impacts induced by the Project are mostly related to

economic aspects. One of the unexpected impacts brought by the Project is that the income of local farmers from Melaleuca growing has reduced due to a dramatic decrease in timber price. As mentioned earlier, the income from one hectare of Melaleuca has reduced from VND50 million in 1997 to VND18-20 million in 2005, that is 2.5 times smaller. The role of Melaleuca trees is being judged by farmers/growers against its economic efficiency compared to other annual agricultural crops. Many households do not feel secure about Melaleuca production, resulting in transferring and/or leasing their land to other people and moving out to settle elsewhere. For instance, of 52 settled households, 41 households did transfer land use rights to others.

3.1.3. Analysis of Factors of Impact

This section is focusing on clarifying factors contributing to and inhibiting expected impacts as well as reasons behind un-anticipated impacts of the Project.

The factors that contribute to achieving the expected impacts of the Project are various and judged based on an analysis of the information from different sources. One of such factors is JICA support, including financial, technical and human resources, to the project which is highly appreciated in terms of timeliness, quantity and quality and met requirements. Another factor is referred to the team of short-term experts who are highly qualified and able to solve emerging problems quickly.

The next factor is that the Project objectives are in line with local authority's willingness to develop agriculture and forestry on acid sulphate land. Although the area of Melaleuca is planned to reduce for 3,000 ha by 2010, forest cover in the Mekong Delta tends to increase, according to the region development strategy.

The project objective are also adopted and supported by local authority and people. It is amended by their active participation in project activities. The time of launching the Project is important in terms of solving local urgent issues. Further, the afforestation technologies developed by the Project are suitable to local physical conditions and hence become easily disseminated. The enthusiasm, dynamics and qualification of Vietnamese staff have also made a huge contribution to the Project success. Moreover, the results of research activities previously carried out by FSSIV and practical experience of local people all contribute to ensure the impacts of the Project. Among these factors, the crucial ones can be considered as the suitability of project-made

afforestation techniques to local physical conditions.

The factors that inhibit expected impacts of the Project are explained in the following terms. First, limited financial resources given to the post-Project activities, for instance tending and protecting young forests planted just before the Project completion, may hinder their success. Second, investment in several equipments such as meteor-hydrological station did not include training of personnel and transfer of technology. As a result, these equipments work less effectively. Third, during and after Project completion, a number of personnel trained by the Project had moved to other units/positions, causing an under-use of these trained staff. Fourth, the existing wage payment system applied to the Vietnamese staff has not been consistent with the Project workload undertaken. Finally, physical conditions such as seasonality also affect the success and progress of several project activities.

The above-mentioned un-anticipated impacts of the Project might be explained by a number of reasons. First of all, the issue of market for forest timber was not taken into account as a factor of risk and uncertainty before designing and implementing the Project. Whereas, the Project mostly focused on how to promote developing forests in acid sulphate soils using alternatively selected tree species and afforestation technologies. Intuitively, the larger the project impact is, the lager forest plantation area is created and the more serious the timber market problem would be. Next, while the Project focused on developing silvicultural technologies for forest trees on acid sulphate soils, technologies of processing timber were almost ignored. Further, in terms of economies of scale, poor households with limited investment capital and land area find difficulty to apply the afforestation technologies developed by the Project to their Melaleuca forest production. For instance, many poor household could not follow costly machinery land preparation and afford seedlings of high yield species such as Melaleuca leucadendra.

3.2. Sustainability

3.2.1. Technical aspects

In line with the above-mentioned impacts of the Project in technical aspects, its technical sustainability is obvious. After the project finished, afforestation technologies developed by the project such as land preparation (embankment making), seedling production, planting, tending and pest control are continuing to be used within and

outside the project area by farmers/forest growers and other projects such as JICA-sponsored Forest Fire Rehabilitation Project in Ca Mau Province. The level of adoption of land preparation methods appears quite high. It is estimated that of around 800 farmers in Thanh Hoa District trained in afforestation technologies on acid sulphate soils, 70 percent have already applied embankment and ditch making techniques. The remaining have not yet applied these due to a high cost (about VND6 million per hectare).

In terms of planting, the model of planting Melaleuca cajuputi VN on embankments is most widely used not only within Long An, but also in other ecological regions. For instance, Melaleuca trees are tested in semi-flooding areas of Hoa Binh and Thac Mo Hydroelectricity Dams. In case of the post-fire forest rehabilitation project in Ca Mau Province, the Project-induce techniques such as embankment and bare root planting are being introduced to new conditions.

However, many technologies developed by the Project, despite their advantages, have been adopted by local farmers/forest growers at a low level. These include the model of planting Melaleuca leucadendra on embankments and techniques of potted seedling and scion cutting production. The main reason for their limited adoption is associated with a high cost of operation. Moreover, seedling making requires a solid bed nursery which is beyond farmers' capacity. The progeny test has not resulted in final conclusions; hence this technology has not yet been disseminated.

One concern related to the Project technical sustainability is the current status of machines and equipments provided by the project. Many machines and equipments are still used effectively for post-project activities. For instance, the laboratory was reallocated to FSSIV Office in Ho Chi Minh City and is being used for soil analysis and tissue culture purposes. Other machines and equipments are also used to maintain everyday nursery activities. On the other hand, some machines and equipments are either under-utilized and/or unused at all. These include the embankment maker "Challenger". The embankment maker "Challenger" was moved to Ca Mau province for making embankments using the Project technologies. However, it seems not suitable to physical (soil) conditions in Ca Mau Province.

3.2.2. Organizational Aspects

In terms of organisational aspects, the sustainability of Project is expressed by the continuity and spread of technological transfer network and activities after the Project finished. In fact, technological transfer is maintained and disseminated regularly through different organizations such as FSSIV, provincial departments in the Mekong Delta, local agriculture-forestry, DARDs, modeled farmers and study tours. The sustainability is also confirmed by the FSSIV ability to continue their technological transfer, research and project-related activities such as progeny test, processing of oil, charcoal, wood chip boards, growing fungus on Melaleuca timber and coppice regeneration. Currently, there are two Japanese experts working at Thanh Hoa Station on some of these issues: one researcher from the University of Tokyo is carrying out laboratorial analysis in using charcoal from different species including Melaleuca timber; and the other – a young volunteer – is working on growing mushroom on Melaleuca timber.

The Project experimental and demonstration forests at Thanh Hoa Station have become a popular place for outsiders, including leaders, managers, researchers, farmers and so on, to visit and learn about afforestation technologies and the possibility of dissemination to other locations. In terms of afforestation techniques, FSSIV is maintaining free advisory services to local farmers and implementing consultancy contracts with large-scale farms and other projects. The activities of FSSIV are continuing with involvement of Project stakeholders such as local agriculture-forestry extension staff and successful farmers.

Other post-project activities such as progeny test in the nursery and monitoring of annual forest growth are also maintained and reported annually to FSSIV. The environmental monitoring of change in water and land quality and meteor-hydrological conditions however is not kept on. As a result, final conclusions on how environmental quality in the project area has changed have not yet been reached.

3.2.3. Financial Aspects

Compared to the technical and organisational sustainability, the financial sustainability of the Project is subject to a big concern. First, a limited access to market for local timber may adversely affect the income and investment payback of local farmers. This situation may lead to rejection of planting Melaleuca species in the area and further

application of technologies developed by the Project for these species. Instead, local farmers may change their investment direction from forestry to agriculture.

Second, financial resources for maintaining FSSIV activities are also problematic. While some post-project activities such as monitoring of forest growth and progeny test are still supported by the state budget allocated annually to FSSIV, others are underperformed due to financial difficulty. The later include review and evaluation of project-induced technological models, repair and maintenance of machines and equipments, buildings, roads and so on. As a result, outcomes from research activities may not be verified, documented and disseminated to end users. Project-sponsored machines and equipments, office buildings and roads are being degraded. This undoubtedly affects the sustainability of the project impacts.

3.2.4. Sustainability of Project Impacts

The analysis of information collected shows some degree of the sustainability of Project impacts in technical aspects. This is confirmed by an on-going spread of afforestation technologies developed by the Project which are being used by different farmers and projects in the Mekong Delta and elsewhere. In social aspects, the impact of infrastructure developed by the Project is also on-going. The constructed roads and canals as a result of the project are contributing to improve living conditions and promote local economic development. The sustainability of the project impact, however, can be hindered if the market for local timber and associated products would not be formulated and supports for post-project activities would not be secured.

3.2.5. Analysis of Factors of Sustainability

There are a number of factors affecting the sustainability of the Project. The first factor is local physical conditions that are suitable for Melaleuca species to grow. That is why exotic Meleleuca species are also growing well in the Project area using the technologies developed by the project. The second factor is that the contribution of local farmers' experience to developing of afforestation technologies makes these technologies and species, introduced later by the project, easily adopted by farmers/forest growers within and outside the project area. Based on discussions with progressive farmers, farmer-to-farmer extension is carried out frequently through visits and/or replication of host farmers' cultivation models by visiting farmers. The third

factor resides in the right selection of highly qualified expatriate experts for carrying out advising tasks and appropriate domestic personnel for managing and being trained and training of other staff and/or farmers.

On the other hand, there exist a number of factors that may hinder the sustainability of the project. These factors are closely linked to different points highlighted above. First of all, a risk of forest fire during the dry season is a big concern for forest growers and managers while the project-related afforestation technologies did not really focus on fire control aspects. Next, lack of financial resources for evaluation and documentation of on-going research and post-project activities can be interpreted that these achievements of the project may not be used in the future and hence hinder continuing spread of the project impacts. Further, as the project paid less attention to consumption of Melaleuca timber, its timber products are less diverse and have a low value. After all, farmers/forest growers are producers who concern about the economic efficiency of their production, that is Melaleuca planting. This is a big challenge for the sustainability of the project.

3.3. Issues / Problems

Currently, the indigenous Melaleuca still dominates in forests within the Project area. One of the reason why local forest growers chose to grow indigenous species more than exotic ones such as Melaleuca leucadendra is associated with usefulness of particular timber. While the advantage of Melaleuca leucadendra in terms of high annual increment is convinced by the Project staff and researchers, its timber is not preferred for construction to that of indigenous Melaleuca species. Another reason resides in a high cost of land preparation and seedlings when planting exotic species. In fact, exotic species require embankment planting methods using potted seedlings while indigenous species can grow well using non-embankment land preparation and direct sowing methods. Furthermore, exotic species are mostly susceptible to pests and insects while indigenous species are not. Damaged trunk timber is actually unable to sell in the market, given it is used mostly for construction purposes.

Another issue is related to the machinery method for land preparation. Using modern machines like “Challenger”, this method of land preparation seems to be productive in local conditions of Thanh Hoa District. However, such a machine might be far expensive that local farmers who are mostly poor cannot afford. Given that, spreading

out of the land preparation method using expensive machines is somewhat limited.

An emerging problem is a degradation of a number of machines and equipments as well as Project Office at Thanh Hoa Station. It is partly because the financial resources for maintaining them are no longer met. On the other hands, some machines and their accessories are left unused, as mentioned earlier.

The next issue is highlighted in relation to the continuity of environmental monitoring. This activity was stopped in 2002 after the follow-up period was finished. Although the previously undertaken environmental monitoring had provided a series of data/ information on water and land quality in terms of pH and EC (Electrical Conductivity), no clear conclusions on how the environmental quality has changed since the Project started have been made, that is whether it has been improved or degraded. Based on the information collected from the field, it is likely that the Project-induced afforestation technologies (land preparation and planting methods and species introduced) help to improve the land quality. However this assessment more or less remains in qualitative terms. Quantitative data are needed to verify such a conclusion.

3.4. Conclusion

The analysis of the information collected during the ex-post evaluation mission reconfirms that the overall goal of the JICA-FSSIV Technical Cooperation Project for Afforestation Technology Development on Acid Sulphate Soils in the Mekong Delta has been met. After completion, the Project has still had large impacts on agriculture and forestry development within and outside the Project area. Many impacts of the Project are continuing and spreading out in the Mekong Delta.

The results of this ex-post evaluation are mainly concerning the impact and sustainability of the Project after its completion. In terms of the impact, it is concluded that the Project has a significant technical influence on agriculture-forestry development in terms of changing plant/crop patterns in the project area, and causes a great spread of afforestation technologies to many other locations outside the Project area. The social impact of the Project is also vital in terms of improving production and living conditions and creating jobs for local inhabitants.

In terms of sustainability, it is concluded that the technical sustainability is obvious in

terms of continuous dissemination and spreading out the outcomes of the Projects, that is afforestation technologies and demonstration models. The economic sustainability of the project, however, is questionable given that the market for timber from local forests is limited and a higher profit from agricultural crops leads to replacement of the former with the latter.

It is further concluded that a lack of financial resources for maintaining on-going activities after the Project completion is hindering the sustainability of the project impacts. Further supports from the Vietnamese Government, and JICA if possible, need to be taken into consideration in order to ensure the sustainability of this successful Project.

4. Recommendations and Lessons

4.1. Recommendations

Given the existing negative impacts of the Project, it is recommended that the following aspects be considered:

1) studying in the market for Melaleuca timber and its related products.
2) continuing research into wood modification of Melaleuca timber for further processing, making different products from Melaleuca woodchips and making charcoal from Melaleuca timber.
3) improving technologies for coppice regeneration and large-size timber of Melaleuca species.
4) conducting research into forest fire control in Melaleuca forests.
5) linking research into Melaleuca tree development to regional planning.

For ensuring the sustainability of the Project, it is recommended financial resources are needed to carry out successive activities such as market survey, research into Melaleuca timber properties and its processing possibilities (e.g. oil extraction, wood-chip board, wood-based panel, etc.), study of economic efficiency of Melaleuca timber growing and so on. Financial supports are also essential for reviewing and consolidating post-project activities in order to disseminate their achievements. Moreover, these financial resources are crucial for maintaining project machines and equipments and improving project infrastructure (e.g. roads, canals and office building). An alternative is to use the revenue from harvesting mature forests created by the Project to cover these expenses.

4.2. Lessons Learnt

Although the Project was completed successfully leaving behind huge impacts, a number of lessons can be drawn from its implementation. The first lesson is that an integrated approach is essential for project design to consider not only project activities and their associated inputs, but also project-induced outputs. Evidence suggests that despite afforestation technologies and species introduced by the Project are appropriate and suitable to local conditions, lack of the market for local timber within the context of the regional socio-economic development may hinder the success and sustainability of such projects.

The second lesson is drawn from the fact that several modern technologies such as machinery method for land preparation using expensive machines can be technically appropriate but financially unreasonable to poor local farmers/forest growers in the Project area and elsewhere.

The third lesson is learnt from the choice of the project rotation. A short Project length and a long forest rotation may lead to difficulty in evaluation of how afforestation technologies would be useful and effective.

The fourth lesson is drawn from the fact that a large share of the project budget was devoted to the Project machines and equipments while the Project itself is referred to as "Afforestation Technology Development Project". It seems that the project impact and sustainability would be greater if the project budget allocation focused more on "technology development".

ANNEX 1

Logical framework

Narrative Summary	Indicators	Means of Verification	Important Assumptions
<Overall Goal> To promote effective and sustainable use of unutilized land with acid sulphate soils in the Mekong Delta for forestry and agriculture	Application of developed technologies to forest and land use plan for Mekong Delta provinces	Forest and land use plan of Mekong Delta provinces	- Development strategies on Mekong delta will not be changed - Forest and land use plan will be implemented
<Project Purpose> To develop practical afforestation technology for the land with acid sulphate soils in Thanh Hoa (former Tan Thanh) area, Long An province	Preparation of afforestation technology guidelines and demonstration forest for extension activities of FSSIV staff	Technology guidelines prepared	- Budget and staff for technology extension will be assured - Agro-forestry technology development will be closely linked
<Outputs> 1) Developed soil improvement technologies for acid sulphate soils in Thanh Hoa (Tan Thanh) area 2) Selected tree species adaptable to acid sulphate soils in Thanh Hoa (Tan Thanh) area 3) Developed technologies of nursery practices and care for tree species adaptable to acid sulphate soils in Thanh Hoa (Tan Thanh) area 4) Proposed methods to mitigate negative effects on surrounding environment caused by leaching of harmful substances from acid sulphate soils 5) Produced appropriate guidelines of afforestation technologies for acid sulphate soils 6) Established demonstration forest on acid sulphate soils	1) Practical land classification and soil acidity amelioration methods reports 2) Survival ratio & growth of tested tree species at test plot 3) Germination ratio, growth rate, effect of weeding 4) Maintaining of canal water quality 5) Reflection of developed technologies in the guidelines, and effectiveness of guidelines for practical use 6) Composition of demonstration forest	1) Experimental data sheets and FSSIV reports 2) Experimental data sheets and FSSIV reports 3) Experimental data sheets and FSSIV reports 4) Water quality charts 5) Technology guidelines prepared 6) Map and operation plan of demonstration forest Site survey	- Severe flooding will not occur - The Project will get support by Peoples Committee - Counterpart personnel will be continuously assigned

<table>
<tr>
<td rowspan="2"><**Activities**>
1) Experiments for developing appropriate technologies for improving acid sulphate soils, including embankment method.
2) Experiments for selecting species adaptable to acid sulphate soils
3) Experiments for developing appropriate technologies of nursery practices and care for tree species adaptable to acid sulphate soils
4) Research on negative effects on surrounding environment caused by leaching of harmful substances through soil improvement processes, and experiments on mitigating such negative effects
5) Preparation of technology guidelines for afforestation
6) Provision of an infrastructure necessary for establishment of demonstration forest on acid sulphate soils</td>
<td colspan="2">INPUT</td>
<td rowspan="2">- Construction of infrastructure will not be hampered by natural disaster

<Pre-conditions>
- The project plan will be approved by the Peoples Committee at provincial and district levels

- Request forms for expert dispatch, trainee acceptance and equipment Thanh Hoa site provision will be submitted in time

- Customs clearance and visa issue will not be delayed</td>
</tr>
<tr>
<td>Vietnam
a) Counterpart and administrative staff
- Project Director
- Project Manager
- Counterparts
- Administrative staff

b) Land and building facilities
- Land for the demonstration forest and nurseries
- A project main office in the FSSIV and a project site office at Thanh Hoa site

c) Expenses necessary for project implementation

d) Equipment other than provided by Japan</td>
<td>Japan
a) Experts dispatchment
(4 long-term experts and short-term experts)

b) Trainees acceptance
(2 trainees per year)

c) Equipment provision
Machinery, equipment, and their spareparts for soil improvement, land preparation, silviculture, nursery etc. Vehicle and spareparts

d) Infrastructure Provision for the demonstration forest

e) Technology exchange programme</td>
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ANNEX 2

Evaluation Grid

1. Impact (I)

Evaluation points	Specific questions		Necessary information/data	Sources of information	Study methods
(1) The extent to which the Project had contributed to promote effective and sustainable use of unutilized land with acid sulphate soils in the Mekong Delta for forestry and agriculture.	I1.1	How have acid sulphate soils been rehabilitated and used for agriculture and forestry production?	Landuse planning, area (ha, %), agriculture-forestry activities on rehabilitated land, land use intensity	FSSIV/Thanh Hoa Station, reports, farmers, District Economic Division	Literature review, interview, comparison (before, during and after project)
	I1.2	How has water quality changed?	pH, colour, float, scent, indicator plants and animals	FSSIV/Thanh Hoa Station, monitoring reports, fieldwork, District Economic Division	Literature review, interview, direct observation
	I1.3	How has land quality changed?	pH, colour, texture, plant growth, underground animals	FSSIV/Thanh Hoa Station, monitoring reports, fieldwork, District Economic Division	Literature review, interview, direct observation
	I1.4	How has plant/crop pattern in the project area changed?	Plant pattern, share in areas for each species	FSSIV/Thanh Hoa Station, project reports, fieldwork, District Economic Division	Literature review, interview, direct observation
	I1.5	How has natural fauna and flora in the project area changed?	Pattern, density, growth process	FSSIV/Thanh Hoa Station, project reports, fieldwork, farmers, District Economic Division	Literature review, interview, direct observation
	I1.6	How are the introduced tree species growing and developing?	Species, area (ha), tree quantity	FSSIV/Thanh Hoa Station, project reports, fieldwork, farmers, District Economic Division	Literature review, interview, direct observation
	I1.7	What species is growing well? What species can naturally regenerated under storey?	Survival rate, D (cm), H (m), species structure and quantity, quality of regenerated trees and vegetation cover	FSSIV/Thanh Hoa Station, project reports, fieldwork, farmers, District Economic Division	Literature review, interview, direct observation

	I1.8	How has pest and disease incidence occurred?	Pest species structure, degree of damage (S, %)	FSSIV/Thanh Hoa Station, project reports, fieldwork, farmers, District Economic Division	Literature review, interview, direct observation
	I1.9	How have seedling and nursery techniques developed by the project been used?	Quantity, area (ha), number of households involved	FSSIV/Thanh Hoa Station, project reports, fieldwork, farmers	Literature review, interview, direct observation
	I1.10	How have afforestation technologies (land preparation, planting) developed by the project been applied?	Methods, formulas, species, area, growth, pest damage	FSSIV/Thanh Hoa Station, project reports, fieldwork, farmers	Literature review, interview, direct observation
	I1.11	How have demonstration forests been disseminated?	Area, means for dissemination, number of households and units participated	FSSIV/Thanh Hoa Station, project reports, fieldwork, farmers, agriculture-forestry extension	Literature review, interview, direct observation
	I1.12	How has household income changed as a result of the project?	Currency amount, share (%), income sources	households, local authorities	Interview, group discussion
	I1.13	How have local forest products been used?	Types of products (construction material, fuelwood, fodder, fish, ...), quantity and use purpose	Thanh Hoa Station, households, local authorities	Interview, group discussion
	I1.14	How has the local employment problem been solved?	Labour-days, percentage of time spent, percentage of male/female, age	households, local authorities	Interview, group discussion
	I1.15	How has farming habit of local people changed?	Farming seasons, farming methods	households, local authorities, agriculture-forestry extension	Interview, group discussion, direct observation
	I1.16	What is the possibility of attracting people from other locations to settle in the area?	Number of people and households settled, population growth rate, seasonal variation	Reports, households, local authorities	Literature review, interview, group discussion
(2) Factors contributing to the	I2.1	What factors have contributed to the success of the project?	Factors, degree of impact (quantity, quality, ...)	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division	Interview, group discussion, in-depth analysis

achievement of the project overall goal.	I2.2	Among these factors, which one is the most important?	Level of importance/score/weight	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division	Interview, group discussion, in-depth analysis
	I2.3	What should JICA and counterpart agencies take into consideration to enhance the effectiveness of the project?	Issues and level of importance	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division	Interview, group discussion, in-depth analysis
(3) The project has not produced expected impact.	I3.1	What were factors inhibiting the expected impact of the project?	Factors, degree of impact (quantity, quality, ...)	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis
	I3.2	What are the reasons for these constraints?	Reasons, level of importance	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis
(4) The project has brought un-anticipated impacts to the beneficiaries.	I4.1	What are unexpected positive impacts brought by the project to the beneficiaries?	Form, scope, degree of impact, impacted parties	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis
	I4.2	What are unexpected negative impacts brought by the project to the beneficiaries?	Form, scope, degree of impact, impacted parties	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis
	I4.3	What are the reasons for these unexpected impacts?	Reasons, level of importance	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis
	I4.4	What should JICA and counterpart agencies take into consideration to prevent negative impact of the Project?	Issues and level of importance	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis

2. Sustainability (S)

Evaluation points	Specific questions		Necessary information/data	Sources of information	Study methods
(1) The Project can produce sustainable impact (from organizational, financial and technical viewpoints).	S1.1	How often does the project technological transfer activity take place?	Number of people, frequency involved; number of organizations/ units participated in the network	FSSIV/Thanh Hoa Station, households, agriculture-forestry extension, reports	Literature review, interview, discussion
	S1.2	Is FSSIV able to continue implementing activities and obtain results after the completion of the project?	Operational plan and achievements	FSSIV/Thanh Hoa Station	Literature review, interview
	S1.3	What are countermeasures that have been taken into account to cope with unexpected changes?	Types, quantity, results (level of success)	FSSIV/Thanh Hoa Station, households	Literature review, interview
	S1.4	How does technical support/assistance from FSSIV/Station to the locality take place?	Types, intensity, frequency, number of people involved	FSSIV/Thanh Hoa Station, households, local authorities, agriculture-forestry extension, reports	Literature review, interview, discussion
	S1.5	What are personnel/staff that were trained by the project are doing? How have they used knowledge and skills obtained from training?	Number of people trained, their current jobs, level of using knowledge/skills trained	FSSIV/Thanh Hoa Station, trained personnel/staff, households, agriculture-forestry extension	Interview, discussion
	S1.6	Are monitoring and evaluation maintained after the project completion?	Types, frequency, people involved, information update, organization	FSSIV/Thanh Hoa Station, reports	Literature review, interview
	S1.7	Do project stakeholders continue to participate in post-project activities?	Type of participation, intensity, motivation, frequency	households, local authorities, agriculture-forestry extension, reports	Literature review, interview, discussion
	S1.8	How has household income from rehabilitated areas been maintained?	Variation of income form one ha per household and per head	households	Interview, discussion, direct observation

	S1.9	How has the level of investment in agricultural/forestry activities been?	Amount of capital, % of investment in agriculture/ forestry, investment moment, means of investment, investors	households, agriculture-forestry extension, District Economic Division	Interview, discussion, direct observation
	S1.10	Does the government support financial resources in order to maintain post-project activities? If Not, where is the budget from?	Types, commitment, quantity, level, time moment, grantee	FSSIV/Thanh Hoa Station, households	Literature review, interview, discussion
	S1.11	How are project machines/equipments currently used?	Types, quantity, level of use, use purpose, maintenance/repair, financial source	FSSIV/Thanh Hoa Station	Literature review, interview, discussion
	S1.12	Are project technological guidelines continuing to be transferred/disseminated to project stakeholders?	Procedures, quantity, level, means, receivers	FSSIV/Thanh Hoa Station, households, District Economic Division, agriculture-forestry extension	Literature review, interview, discussion, direct observation
	S1.13	How have knowledge/technologies that were transferred to local people been adopted?	Number of people still apply, degree of application	households, District Economic Division, agriculture-forestry extension	Literature review, interview, discussion, direct observation
	S1.14	What technical models are still adopted by local farmers?	Models. Selected species, number of households applying, area	households, District Economic Division, agriculture-forestry extension	Literature review, interview, discussion, direct observation
(2) Factors contributing/ inhibiting in producing sustainable impact of the Project.	S2.15	What are factors that contributed to producing sustainable impacts of the project?	Types, quantity, quality, level of impact	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis
	S2.16	What are factors that inhibited to producing sustainable impacts of the project?	Types, quantity, quality, level of impact	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis
	S2.17	What should JICA and counterpart agencies take into consideration in order to ensure the sustainability of the Project?	Issues, importance order	FSSIV/Thanh Hoa Station, households, local authorities, District Economic Division, agriculture-forestry extension	Interview, group discussion, in-depth analysis

ANNEX 3 - QUESTIONNAIRES

QUESTIONNAIRE FORM No. 1

(For interviewing farmers/households)

Date: *February ....., 2006*

Code: .....

Interviewer's name:……

PART I. GENERAL INFORMATION

1. Interviewee's name: ……..

2. Place of residency: ……....

3. Age…… 4. Sex…… (Male =1; Female = 0) 5. Ethnic group….. (1 = Kinh; 0 = others)

6. Level of literacy…… (years of schooling)

7. Total area of household used land: ……..ha. Of which:

- for agriculture: ……..ha
- for forestry: ……ha
- for aquaculture: .....:…...ha
- for other purpose:.....ha

8. Number of household regular labourers:..... Of which:

Male.....Female.....

9. Estimated household income in 2005:

Total income……VND mln. Of which:

- from agriculture: ……VND mln.
- from forestry: ……...VND mln.
- from others: ……...VND mln.

PART II. PROJECT IMPACT

10. Household involvement in Project activities:

- Rehabilitated land area with project supports:.....ha
- Year of involvement .....

11. How large is your land area for agriculture/forestry activities?

- before Project: .....ha
- upon Project completion: .....ha
- at present: .....ha

12. How has the crop pattern in household land changed?

Before Project		Upon Project's completion		At present	
Species	Area (ha)	Species	Area (ha)	Species	Area (ha)

13. After involvement in the Project, have your cultivation means and farming custom changed?

Yes [ ] No [ ]

If Yes, what are the new means of cultivation?

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If No, what are the reasons?

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14. Has your household applied afforestation technologies developed by the Project?

Yes [ ] No [ ]

If Yes, please specify: .....
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If No, what are the reasons?

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15. Has your household applied land preparation technologies developed by the Project?

Yes [ ] No [ ]

If Yes, please specify: .....
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If No, what are the reasons?

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16. Has your household used seedlings created by Project's nursery?

Yes [ ] No [ ]

If Yes, how many hectares were planted using seedlings from Project's nursery? .....ha

If No, what are the reasons?

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17. Has your household applied demonstration forest models developed by the Project?

Yes [ ] No [ ]

If Yes, how large is the area applying these models?.....ha

18. From your point of view, has water quality in the project area changed?
Increased [ ] Decreased [ ] Unchanged [ ]
Other.....

How are you aware of this change?

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19. From your point of view, has land quality in the project area changed?
Increased [ ] Decreased [ ] Unchanged [ ]
Other.....

How are you aware of this change?

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20. How have pest incidences occurred in your land area involved in the project?

Tree species	Before Project		Upon Project completion		At present	
	Pest, disease	% damage	Pest, disease	% damage	Pest, disease	% damage

21. How large is your annual household income from the area involved in the project?

Income .....VND

22. What are products being harvested/collected from the area involved in the project activities?

Products	Harvest source	Use purpose	Quantity	Market price	Total (in VNDD)

23. How many labourers has your household mobilised in the project-related activities?

- Total labourers..... Of which:
  + male.....
  + female.....
  + in-age .....
  + over-age .....
  + under-age.....

24. From your point of view, which technological guidelines/models developed by the Project are considered successful?

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25. From your point of view, what successes/benefits/contributions have been brought you and the locality by the Project?

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What are the reasons for such successes/benefits/contributions?

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PART III. PROJECT SUSTAINABILITY

26. Does your household still get technical/financial supports from the Project?

Yes [ ] No [ ]

If Yes, how does this assistance take place?

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27. Are you still continuing to invest in agricultural/forestry activities as a result of the Project?

Yes [ ] No [ ]

If Yes, how large is your investment?

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28. What project-related activities are you still involved in?

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29. What technologies transferred by the Project are you still applying?

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If Not, what are the reasons for not using technologies developed by the Project?

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30. What technologies/models are worth to be applied and disseminated in the future? .....
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If so, why?

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31. Have your living conditions improved since involvement in the project activities?

Yes [ ] No [ ]

How have the conditions improved?

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What are the reasons or contributing factors?

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QUESTIONNAIRE FORM No 2

(For interviewing FSSIV personnel and local staff)

PART I. PERSONAL INFORMATION

1. Interviewee's name: .....
2. Age: ..... Male □ Female □
3. Professional degree: ..... Specialisation: .....
4. Occupation: .....
5. Organisation: .....

PART II. PROJECT IMPACT

1. From your viewpoint, how does the rehabilitated land in the project area usable for agricultural and forestry use vary at:

- before Project: ..... ha
- upon Project completion: .....ha
- at present: .....ha

2. From your viewpoint, which among the tree species selected by the project grow well? What are their current survival rate and average dimensions (D, H)? What are species that can be grow on the rehabilitated area?

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3. How large are the area and number of planted species?

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4. Which species are vulnerable to pests and diseases? To what extent is the damage? How do pests and diseases affect plant's growth?

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5. How many seedlings created by the project nursery have been used for afforestation? How large is the afforested area at the moment? How many households have been involved in making seedlings in the nursery and how many involved in forest plantation?

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6. How has the tree/crop pattern in the impacted area changed?
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7. What methods for land preparation have been applied? What are types and degree of application?
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8. What demonstration models have been disseminated? How large is the disseminated area? How does the dissemination take place? How many households and other units have been involved?
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9. After land rehabilitation, has water pH in the project area changed? How does the change take place? What indicators can be used for observing a change in water quality?
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10. After land rehabilitation, has land pH in the project area changed? How does the change take place? What indicators can be used for observing a change in land quality?
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11. From your viewpoint, has income of the households in the project area changed? Is the income increased or decreased and why?
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12. What products are made as a result of the land rehabilitation for agricultural and forestry activities? What purposes are they used for?
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13. From your viewpoint, do project activities contribute to job creation for local people? If yes, what types of jobs are created? When do these jobs take place?
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14. From your viewpoint, do project activities contribute to a change in perception and farming habits of local people? How does the change take place?
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15. From your viewpoint, is there a great number of people come from other locations to settle in the project area? What are the reasons/motivations for such a resettlement?
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16. According to the terminal evaluation report, the project is considered successful. What are factors contributing to this success? Which factors are important and crucial?
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17. What are factors inhibiting the expected results of the Project? What are the reasons?
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PART III. SUSTAINABILITY

18. From your viewpoint, is the existing technological transfer network still working? How is it currently organised? How many people have been introduced and how often has technological transfer been done? Who and what organisations have been involved?
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19. How do FSSIV and Thanh Hoa Station maintain technical support/ consultancy provision to the locality? How often has it been carried out and how many people have been involved? In what forms and to what extent is the support carried out?

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20. What and where do the people trained by the project do at the moment? How have they used the trained knowledge and skills for their jobs?

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21. Are monitoring activities maintained after the project was completed? In what forms and to what extent are they organised?

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22. How are the machines and equipments provided by the Project used? Are they used regularly? What purposes are they used for? Are they maintained/repaired regularly and timely?

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23. Are the technologies/guidelines developed by the project continuing to be improved and transferred/disseminated? What technologies/guidelines were transferred/disseminated and to whom? How were they transferred/ disseminated?

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24. From your viewpoint, what technologies/guidelines have been adopted by local people? To what extent are they adopted?

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25. From your viewpoint, what are factors contributing to ensure the sustainability of the project?

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26. From your viewpoint, what are factors inhibiting the sustainability of the project?

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27. From your viewpoint, what else should JICA and counterpart parties take into account to ensure the sustainability of the project?

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