

**Ex-Post Project Evaluation 2010:  
Package I-5  
(Senegal)**

**December 2011**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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**FOUNDATION FOR ADVANCED STUDIES ON  
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## Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2008, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2007. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

December 2011  
Masato Watanabe  
Vice President  
Japan International Cooperation Agency (JICA)

## Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

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Senegal

Ex-Post Evaluation of Japanese Technical Cooperation Project  
“Integrated Forestry Community Development Project (PRODEFI)”

External Evaluator: Keiichi Takaki,  
Foundation for Advanced Studies on International Development

0. Summary

This project was implemented with the purpose of improving livelihood and promoting sustainable natural resource management with the participation of local populations in dry land of Senegal. The evaluation in terms of relevance of this project is high since it is consistent with Senegalese development policies, development needs, and Japan’s ODA policy for Senegal. The evaluation in terms of effectiveness and impact is fair since PRODEFI model for sustainable natural resource management was developed, implemented and had achievements in target villages and their neighboring villages. However, this model was not disseminated beyond these villages. The evaluation of efficiency is fair since the initial plan of the main phase was excessive, and had to be modified in the later stage of the implementation, and the extended phase had to be implemented in order to reach the initial goal. The evaluation in terms of sustainability is fair. The project aimed to achieve sustainability in terms of natural resource management in the target areas, and dissemination of the PRODEFI model outside the target area, and the former was achieved and the latter was not. From the above, the overall evaluation of this project is partially satisfactory.

1. Project Description



< Forestry of an assisted village >

1.1 Background

60 percent of the population in Senegal live in villages, and are engaged in the primary industries, which depend on the natural environment. Continued desertification, caused by drought of more than 20 years, mismanaged land development, excessive grazing, and forest fire, is a serious problem since it is preventing regional development. In view of

the fact that these vicious cycles are because of degraded regional ecosystem due to decreased forestry resources, degraded soil, and lack of people's awareness, the Government of Senegal formulated forestry action plan, and is engaged in forestry activities in order to recover the ecosystem. The purposes of this project were to formulate a development model for the management and utilization of village resource, and to promote forestry in villages by Senegalese villagers as main actors, and to support the dissemination of the formulated model for village forestry and village development.

## 1.2 Project Outline

Overall Goal		Action programs for sustainable management of natural resources are initiated and implemented by local populations.
Project Objective		Main Phase: The extension model of sustainable natural resource management is established in the targeted areas <sup>1</sup> . Extended Phase: To implement the PRODEFI <sup>2</sup> model as natural resource management extension model, improve it, and disseminate it in the target areas.
Outputs: Main Phase	Output 1	The baseline data of natural environment and socio-economic situations are collected.
	Output 2	Training programs to train volunteer farmers are developed.
	Output 3	Training programs are modified and implemented with the participation of farmers
	Output 4	The provisional extension model using the network of volunteer farmers is implemented
	Output 5	Local resources are mobilized by local people with the minimum assistance.
	Output 6	The result of implementing the PRODEFI model is publicized.
	Output 7	Capacity of the PRODEFI project is improved.
Outputs: Extended Phase	Output 1	The basic data of socio-economic situations and ecosystem of target villages are collected.
	Output 2	Training programs are designed in collaboration with people of target villages.
	Output 3	Villagers participate in training programs

<sup>1</sup> Target area (=project intervention villages) are 30 villages located near Bao Bolong river in Kaolack region. The total population of 30 villages is 10,583.

<sup>2</sup> The purpose of this project is to design and disseminate a participatory development model named PRODEFI. The features of the PRODEFI model are 1) to implement training programs in the villages, to use local resources (people, material, fund), 3) to be responsive to local needs of training topic such as tree planting and vegetable growing, 4) not to select participants but to allow anyone to participate to encourage maximum participation. The implementation and dissemination of the PRODEFI model is carried out by the government, donor agencies and NGOs.

	Output 4	The extension model of sustainable natural resource management is practiced by the network of trainees.
	Output 5	Villagers use local resources in order to continue sustainable natural resource management after participating in training programs
	Output 6	Achievements of implemented PRODEFI model become broadly accessible.
	Output 7	Capacity of management, coordination and collaboration of the PRODEFI project is enhanced.
Inputs		<p>Main Phase</p> <p>Japanese Side:</p> <ol style="list-style-type: none"> <li>1. 17 Experts 8 long-term experts, 9 short-term experts</li> <li>2. 9 Trainees received</li> <li>3. Equipment 42.71 million yen</li> </ol> <p>Senegalese Side:</p> <ol style="list-style-type: none"> <li>1. 6 Counterparts</li> <li>2. Land (for headquarters office, and Niore office)</li> <li>3. Local Share (Approximately 1.5 million yen)</li> </ol> <p>Extended Phase</p> <p>Japanese Side:</p> <ol style="list-style-type: none"> <li>1. Experts 12 8 long-term experts, 4 short-term experts</li> <li>2. 4 Trainees received</li> <li>3. Equipment 9.3 million yen</li> </ol> <p>Senegalese Side:</p> <ol style="list-style-type: none"> <li>1. 6 Counterparts</li> <li>2. Land (for headquarters office, and Niore office)</li> <li>3. Local Share (Approximately 8.24 million yen)</li> </ol>
Total cost		Main Phase: 651 million yen Extended Phase: 216 million yen
Period of Cooperation		Main Phase: January 15, 2000 – January 14, 2005 Extended Phase: January 15, 2005 – March 31, 2008
Implementing Agency		Directorate for Waters, Forests, Hunting and Soil Conservation, Ministry of Environment and Nature Protection
Cooperation Agency in Japan		Forestry Agency, Ministry of Agriculture, Forestry and Fisheries

Related Projects (if any)	Japan Overseas Cooperation Volunteers (JOCV)
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### 1.3 Outline of the Terminal Evaluation

#### 1.3.1 Achievement of Overall Goal

##### 1.3.1.1 Main Phase

The first indicator of the overall goal was the number of development organizations such as donor organizations and NGOs that implement the PRODEFI model formulated by this project, and the second indicator was the number of villagers that continued to use the model. The project did not have noticeable development in terms of the first indicator at the time of the Terminal Evaluation. The project had the remarkable progress in Niore in terms of the second indicator.

##### 1.3.1.2 Extended Phase

Overall Goal is expected to be reached in view of various activities such as agreement for cooperation with another project financed by another donor, although no development organizations such as other donors and NGOs implement PRODEFI model.

#### 1.3.2 Achievement of Project Objective

##### 1.3.2.1 Main Phase

The indicators of project objective were accessibility, acceptability, and easiness of the model, and they are still being examined. However, two areas from four areas are about to demonstrate good achievements in these aspects. The project objective is expected to be mostly reached.

##### 1.3.2.2 Extended Phase

The first indicator of the project objective was that the PRODEFI model based on extension network of participants of the training programs is written in English and French, and can be used by others. The draft users' manual was prepared, and was to be finalized before the end of the project. The second indicator is the number of manuals distributed. Forty draft users' manuals were distributed to the Forestry Department, fifty were distributed to NGOs and other donor organizations in Kaolack. The third indicator was the comments by organizations relevant to the PRODEFI model. The participants of the seminar commented that the model was the appropriate approach for the sustainable natural resource management by the local people.

#### 1.3.3 Recommendations

##### 1.3.3.1 Main Phase

1) The Government of Senegal should use the PRODEFI model developed by the project and should identify other users such as other donors and NGOs that may use the model.

2) The Government of Senegal should continue extension service and monitoring so that they can assist local people to continue their activities by themselves.

#### 1.3.3.2 Extended Phase

1) In order to sustain and further develop project achievements for ensuring autonomous development (sustainability) of project activities, the Forestry Department in Dakar should continue to provide technical support to the local people.

2) It is important for the Forestry Department in Dakar to allocate the budget for vehicle fuel and maintenance in order to ensure the effective assistance of the Niore Forestry Department for the local people.

3) It is important for the Forestry Department in Dakar to approach other donors and explaining PRODEFI model in a plain manner so that they can adopt and implement the model.

In reaction to the above recommendations, the Government of Senegal use PRODEFI model in the target villages and their neighboring villages, and provide technical assistance and monitoring for the villagers. However, they are not approaching other donors to disseminate the model. Other actions taken by the government are discussed in the sections of effectiveness and sustainability.

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Keiichi Takaki,

Foundation for Advanced Studies on International Development (FASID)

### 2.2 Duration of Evaluation Study

Duration of the Study: January 2011 – January 2012

Duration of the Field Study:

February 14 – February 28, 2011 & June 1 – June 30, 2011

### 2.3 Constraints during the Evaluation Study (if any)

None

## 3. Results of the Evaluation (Overall Rating: C<sup>3</sup>)

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<sup>3</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory



### 3.1 Relevance (Rating: ③<sup>4</sup>)

#### 3.1.1 Relevance with the Development Plan of [Country X]

The National Plan for Economic and Social Development for 1996-2001 was the development plan of the Government of Senegal when the Main Phase of the project started. This plan included the basic policies with regards to various engagements in areas such as economy, society, food, environment and others. In forestry sector, Forestry Action Plan in Senegal formulated in 1993 was to continue the forestry development action plan formulated in 1981, and this indicated the consistency between development policies and the project at the time of project planning. The Government of Senegal formulated PRSP (Poverty Reduction Strategy Paper) 2003-2005 and PRSP II 2006-2011 and these became the highest development plan for the country. These plans indicated importance of forestry sector and indicated consistency between development policy and the project of the extended phase.

#### 3.1.2 Relevance with the Development Needs of Senegal

60 percent of the population in Senegal is farmers. However, desertification caused by drought of more than 20 years, mismanaged land development, excessive grazing, and forest fire is a serious problem as it is preventing regional development. Since these vicious cycles are because of degraded regional ecosystem due to decreased forestry resources, degraded soil, and lack of people's awareness, the project is consistent with the development needs.

This project is consistent with development issues of Senegal such as sustainable development and the policy measure such as sustainable natural resource management to prevent degrading natural resources. It is also consistent with the local development needs since it is relevant to the policy measures to prevent soil degrading and soil erosion in the groundnut basin region.

The features of the PRODEFI model developed by the project are 1) its flexibility to meet people's needs, 2) the maximum use of local resources, and 3) its openness of the training programs for any person. These features are consistent with the government (forestry department) that had development of social forestry by people's participation and extension of agroforestry as important challenge, and people's needs that prioritized improved livelihood and living as important issues.

#### 3.1.3 Relevance with Japan's ODA Policy

Japan's ODA policy for Senegal before the implementation of this project was formulated in 1995, and considered environment (prevention of desertification) as the important area. The project included the provision of seedling and afforestation, and thus consistent with the project objective and activities.

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<sup>4</sup> ③: High, ② Fair, ① Low

From the above, this project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

### 3.2 Effectiveness and Impact (Rating:②)

#### 3.2.1 Project Outputs

##### 3.2.1.1 Project Output

##### 3.2.1.1.2 Main Phase

- 1) Output 1: Collection of the baseline data of natural environment and socio-economic situations

For the purpose of formulating effective project activities, the project collected baseline data of the target villages on the natural environment and socio-economic situations. Thus, Output 1 was achieved.

- 2) Output 2: Training programs are developed to train volunteer farmers
- Output 3: Training programs are modified and implemented with the participation of farmers

Training programs to train volunteer farmers were designed and implemented in 18 target villages with 17 themes for 229 times in total. The running number of 8,689 persons (1,862 males and 6,827 females) participated in the programs. Thus Outputs 2 and 3 were achieved.

- 3) Output 4: The provisional extension model using the network of volunteer farmers is implemented

Participants of the PRODEFI training programs have the high degree of extending the training contents to those who did not participate in the training. For example, three villages in Fimela had training programs on vegetable processing and dyeing, and the participants worked together, using the technique they learned. Since such working places were located in an open space, other villagers often became interested, and as the result, those who did not participate in the training programs also learned the technique from the participants. It was also reported that the participants taught their family members the technique they learned.

Table 1 indicates the number of villagers who can train technique in each area. The comparison between 1999 before the main phase started and 2005 when the project was completed, the number of those who can train technique in tree planting in 1999 was 1.8 and the number of those who can train it in 2005 was 24.3. The number of villages who can teach seedling production and procurement increased from 1.1 in 1999 to 31.6 in 2005. The number of villager who can teach charcoal production and selling increased from 1.1 to 1.9. These indicate that the technique taught in the training programs was disseminated from the

participant villagers to others. From the above, Output 4 was achieved.

Table 1. The number of persons who can train others in each village (Average)

Area	1999 Number of persons	2005 Number of persons
Tree planting	1.8	24.3
Seedling production & procurement	1.1	31.6
Charcoal production & selling	1.1	19.1
Stone line	0.9	25.4
Frame dams	0.4	10.3
Vegetable growing	0.7	22.7
Fruit and vegetable processing	0.6	27.0
Livestock fattening	2.3	15.6
Fruit tree	2.0	20.1

(Source: Survey conducted by the evaluator in February 2011 from chiefs of 9 villages which participated from the main Phase.

The data are recall of the respondents, thus not accurate.

- 4) Output 5: Local resources are mobilized by local people with the minimum assistance

In order to examine how much Output 5 was achieved, I will first discuss activities in the areas covered by the training programs, and then I will analyze the relations between the resources and activities. Table 2 concerns the average number of villagers who are engaged in activities in each area, and it indicates that those engaged in tree planting increased from 48.1 in 1999 before the implementation to 111.7 in 2000 when the project started and to 149.1 in 2005 when the project was completed. As for seedling production & procurement, it was 11.6 in 1999, and increased to 25.4 in 2000, and to 46.9 in 2005. According to the information provided by JICA, the number of persons in the 9 villages was 317 on average and this indicates that the large portion of the total population of the villages is accounted for by the numbers of villagers active in each area.

Table 2 The number of villagers engaged in each activity (average)

Area	1999 Number of persons	2000 Number of persons	2005 Number of persons

Tree planting	48.1	111.7	149.1
Seedling production & procurement	11.6	25.4	46.9
Charcoal production & selling	0.7	3.8	18.3
Stone line	2.2	17.7	45.1
Frame dams	0.2	5.7	11.1
Vegetable growing	10.9	27.1	39.6
Fruit and vegetable processing	11.9	23.6	45.9
Livestock fattening	2.7	10.6	15.1
Fruit tree	8.2	23.0	32.6

(Source: Survey conducted by the evaluator in February 2011 with from chiefs of 9 villages which participated from the main phase.

The data are recall of the respondents, thus not accurate.

Table 3 indicates the large increase in the number of trees (average) newly planted in 1999 before the project, in 2000 when the project started, and in 2005 when the project was completed, as the average numbers of trees planted were 547.2 before the project started, and 1,547.2 when the project was completed. According to the village chiefs, the total number of trees planted and remaining in these villages was 5,713. This indicates difficulty of tree planting because of salty soil, harmful insects such as termites and lack of tree planting technique, and this indicates the significant impact of the project.

Table 3. The number of trees newly planted among 9 villages that participated in the main phase.

	1999	2000	2005
The number of trees planted (number/village)	547.2	719.4	1,547.2

(Source: Survey conducted by the evaluator in February 2011 with Chiefs of 9 villages which participated from the main phase.

The data are recall of the respondents, thus not accurate.

Next, I will analyze the degree of activeness in tree planting and the degree of sufficiency of resources necessary for tree planting for which I collected the data in the beneficiary survey in the field survey. (The data were of 60 respondents living in 3 villages of the target village of the main phase, which was randomly selected. The data covers 6 years from year 2000 when the project started to 2005. Refer to the column of this report for the details of data collection procedure.) In this survey, respondents answered the degree of activeness in each activity in five scales (5=very active, 4=active, 3=neutral, 2=not active, 1=not active at all), and the degree of sufficiency of resources such as fund and materials necessary for

each activity in five scale (5=much sufficient, 4=sufficient, 3=neutral, 2=not sufficient, 1=not sufficient at all). Table 4 shows the correlations of these two variables and all the coefficients are above 0.8 and statistically significant ( $p<0.01$ ), close to the perfect correlation of 1.0. This means that villagers own and mobilize resources in accordance with the activeness in each activity. As Tables 2 and 3 showed, villagers were active in each activity, and this analysis supports that activeness in each activity is because of sufficiency of resources. From the above, Output 5 was achieved.

Table 4. Correlations between activeness and sufficiency of resource in each area

Area	Coefficient
Tree planting	0.89
Seedling production & procurement	0.91
Charcoal production & selling	0.97
Stone line	0.96
Frame dams	0.86
Vegetable growing	0.86
Fruit and vegetable processing	0.94
Livestock fattening	0.93
Fruit tree	0.91

(All the coefficients are statistically significant. ( $P<0.01$ ))

6) Output 6: The result of implementing PRODEFI model is publicized.

The first indicator of Output 6 was the publication of the PRODEFI project in English and French and the second indicator is how much well known PRODEFI model was among local people and donor organizations. With regards to the first indicator, “PRODEFI model evaluation report” evaluated actual achievement by using the PRODEFI model, and “PRODEFI model induction paper” explained the concept and summary of how to use the model. With regards to the second indicator, the information provided by JICA reports that the model was well known in the target areas, but was not known in other areas. Thus, Output 6 was not achieved.

7) Output 7: Capacity of PRODEFI project is improved.

The terminal evaluation pointed out that project staff and villagers had communication problems, and whether they were solved is not ascertained.

### 3.2.1.1.3 Extended Phase

- 1) Output 1: The basic data of socio-economic situations and ecosystem of target villages are collected.

For the sake of formulating effective project activities, surveys were conducted; Baseline survey report and regional resource survey report were prepared, and used for formulating training programs. Thus, Output 1 was achieved.

- 2) Output 2: Training programs are designed in cooperation with people of target

Output 3: Villagers participate in training programs

With regards to the training programs, more than 8 training modules<sup>5</sup> were formulated and implemented in 21 villages which participated in the project at the extended phase, and more than 3 modules were formulated and implemented in 9 villages which participated in the project since the main phase. The running numbers of the participants in the training programs were 15,824 (5,002 males and 10,822 females). Thus, Outputs 2 and 3 were achieved.

- 3) Output 4: Extension model for sustainable natural resource management is being implemented by the network of trainees.

According to the final report of the project, 59.2% of the participants in the training program acquired knowledge and skills, and 50 villagers who did not participate in the training programs learned skills from the participants, and actually used them.

Table 5 indicates the average number of villagers who can train technique in each area in 2005 when the extended phase started and in 2008 in all target 30 villages. The average number of villagers who can train others in tree planting increased from 54.4 in 2005 to 63.7 in 2008, the average number of villagers who can train in stone line increased from 23.9 to 28.8. The average numbers of villagers who can train in all the other areas increased. Thus, Output 4 was produced.

Table 5. The number of persons who can train others in each village (Average)

Area	2005 Number of persons	2008 Number of persons
Tree planting	54.4	63.7
Seedling production & procurement	28.4	34.2

<sup>5</sup> A training module is an element to constitute a training program. Each module has a degree of completion. By combining modules, training programs can be designed for different purposes and participants.

Charcoal production & selling	36.5	46.7
Stone line	23.9	28.8
Frame dams	12.4	16.4
Vegetable growing	40.9	47.2
Fruit and vegetable processing	37.9	47.6
Livestock fattening	11.7	17.9
Fruit tree	19.0	23.9

(Source: Survey conducted by the evaluator in February 2011 from chiefs of 30 target villages.

The data are recall of the respondents, thus not accurate.

- 4) Output 5: Villagers use local resources in order to continue sustainable natural resource management after participating in training programs

With regards to the activity situations, the information provided by JICA mentioned the number of participants in the training program on sustainable natural resource management in 2006 was 200 individuals, 29 groups in 2006, and it was 302 individuals and 26 groups in 2007.

In order to examine how much Output 5 was achieved, I will first discuss activities in areas covered by the training programs, and then I will analyze the relations between the resources and activities.

Table 6 concerns the average number of villagers who are engaged in activities in each area from 2005 when the project started in 2008 when it was completed. Those engaged in tree planting increased from 140.1 to 173.7, those engaged in seedling production & procurement increased from 41.4 to 97.4 and those engaged in other activities increased except that the number of those engaged in fruit and vegetable processing slightly decreased. Comparing the increase of the number of villagers active in tree planting between the main phase and the extended phase, the rate of increase of the extended phase is lower as indicated by 48.1 in 1999 before the main phase started and 149.1 in 2005 when the main phase was completed, and 140.1 in 2005 when the extended phase started and 173.7 in 2008 when the extended phase was completed. The possible reason for this different rate of increase is that in the main phase, the training programs already encourage participation from outside target villagers, and those from the villages which became the target from the extended phase already participated in the training programs.

Table 6 The number of villages engaged in each activity (average)

Area	2005	2008
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	The number of persons	The number of persons
Tree planting	140.1	173.7
Seedling production & procurement	41.4	97.4
Charcoal production & selling	34.4	50.8
Stone line	67.4	73.3
Frame dams	17.1	24.1
Vegetable growing	65.9	71.0
Fruit and vegetable processing	54.7	54.5
Livestock fattening	21.2	26.0
Fruit tree	33.4	39.6

(Source: Survey conducted by the evaluator in February 2011 from chiefs of 30 target villages.

The data are recall of the respondents, thus not accurate.

Table 7 concerns the survey with the village chiefs of 30 villages as the respondents on the average number of trees new planted in 2005 and 2008. It was 2,037 in 2005 when the extended phase was started and it was 2,306 in 2008. Although it slightly decreased from 2005 to 2008, it maintains the same level. In these villages, the average total number of trees planted is 5,889. Although about 2,000 trees are newly planted every year, the total number is 6,000. The reasons can be that some trees were cut and sold, and others did not grow well and died.

Table 7. The number of trees newly planted among 21 villages that participated in the main phase.

	2005	2008
The number of trees planted (number/village)	2,039	2,036

(Source: Survey conducted by the evaluator in February 2011 from chiefs of 30 target villages.

The data are recall of the respondents, thus not accurate.

Next, I will analyze the degree of activeness in tree planting and the degree of sufficiency of resources necessary for tree planting for which I collected the data in the beneficiary survey. (The data were of 40 respondents living in 2 villages of the target village of the extended phase, which was randomly selected. The data cover 4 years from year 2005 to



year 2008. Refer to the column for the details of data collection procedure.) In this survey, respondents answered the degree of activeness in each activity in five scales (5=very active, 4=active, 3=neutral, 2=not active, 1=not active at all), and the degree of sufficiency of resources such as fund and materials necessary for each activity in five scale (5=much sufficient, 4=sufficient, 3=neutral, 2=not sufficient, 1=not sufficient at all). Table 8 indicate the correlation of these two variables and all the coefficients are above 0.8 and statistically significant ( $p<0.01$ ), close to the perfect correlation of 1.0. This indicates that villages own and mobilize resources as in accordance with the activeness in each activity. As tables 6 and 8 indicated, villagers were active in each activity, and this analysis supports that activeness in each activity is because of sufficiency of resources. The above indicates that Output 5 was achieved.

Table 8. Correlations between activeness and sufficiency of resource in each area

Areas	Coefficients
Tree planting	0.84
Seedling production & procurement	0.92
Charcoal production & selling	0.92
Stone line	0.93
Frame dams	0.93
Vegetable growing	0.89
Fruit and vegetable processing	0.94
Livestock fattening	0.94
Fruit tree	0.93

(All the coefficients are statistically significant. ( $P<0.01$ ) )

- 6) Output 6: Achievements of implemented PRODEFI model becomes broadly accessible.

In accordance with the project final report, the project organized 13 dissemination seminars on planning, implementation and outcomes of the project. For the sake of broad accessibility of the project achievements, the summary of the project final report, the project final report in Japanese and in French, PRODEFI users' manuals in Japanese, in English and in French are available at the JICA web site. This indicates that Output 6 was achieved. However, this has not contributed to the dissemination of the PRODEFI model.

- 7) Output 7: Capacity of management, coordination and collaboration of

the PRODEFI project is enhanced.

In accordance with the survey conducted by the project, 93.5% of the 294 respondents are satisfied in terms of income generation activities and capacity development.

In terms of collaboration with donor organizations, PROGERT (Projet de Gestion et de Restauration des terres dégradées du Bassin Arachidier : Project to manage and recover degraded soil assisted by UNDP and the Global Environment Fund) provided fund to purchase materials necessary for training programs (27 training programs organized in 10 villages: 8 target villages, and 2 villages newly joined the PRODEFI activities) organized by PDL which was established by the PRODEFI project staff at the time of the project completion. However, there was no other collaboration. Thus, the project did not have adequate achievement in collaboration with other donors.

### 3.2.1.2 Achievement of Project Objectives

- 1) Main Phase: The extension model of sustainable natural resource management is established in the targeted areas.

The indicator was the quality of the PRODEFI model in terms of easiness, acceptability, and easiness in implementation of the model. Training programs are the core of the PRODEFI model, and its main features are that they are organized in target villages, necessary resources such as trainers and materials for the training programs are supplied by the target villages as much as possible, participants are not pre-selected and anybody can participate, and the training programs can flexible and responsive to the needs of local people. Because of these features, the PRODEFI model was accepted by target villages in the extended phase and contributed to achievements of Output 2 (training module designed), Output 3 (training programs implemented). Thus the project objective of the main phase was achieved.

- 2) Extended Phase: To implement the PRODEFI model as natural resource management extension model, improve it, and disseminate it in the target areas.

The first indicator of the project objective is extension model for sustainable natural resource management based on the extension network of the training program participants is available in English and French. The relevant publications are used in villages where PRODEFI is implemented. The summary of the project final report, the project final report in Japanese and in French, PRODEFI users' manuals in Japanese, in English and in French are available at the JICA web site, thus they can be used by an organization that may be interested in the model. However, these are not actually implemented by new organizations and have not contributed to the dissemination of the model. The second indicator is the number of manuals of the PRODEFI model, and forty manuals were given to

the Forestry Department, fifty were given to NGOs and other donor organizations in Kaolack and two were given to others from other areas. However, such manuals given to these organizations did not mean that they were used, the model was adopted and disseminated. Thus, this indicator has no substantial meaning. The third indicator was the comment by organizations relevant to the PRODEFI model. In accordance with the information provided by JICA, the participants of the seminar organized in Nioro in 2007 commented that the model was the appropriate approach for promoting the sustainable natural resource management by the local people. However, such comments did not lead to any organization to adopt the PRODEFI model, and these comments do not reflect the dissemination of the model. From the above, the project objective of the extended phase is not achieved. Over all, this project has somewhat achieved its objectives, therefore its effectiveness is fair.

Next, I will try to analyze why PRODEFI model has not been implemented outside target areas despite the fact that this model was adopted by the target villages and demonstrated its effectiveness. This model has quite unique features in the design of training programs, which are to use village resources such as trainers, to implement training program in the villages without selecting participants so that any person can participate. These are the key features for the PRODEFI model to be effective, and may be difficult to appreciate its effectiveness because of the uniqueness of these features. Although it demonstrated effectiveness in the target villages, there are no other practices. Thus, In order to generate sufficient appreciation of its usefulness and practicability as a policy instrument, organizing seminars to report the project achievements, and giving manuals were not enough. More adequate activities should have been undertaken with sufficient schedule.

The Forestry Department in Nioro continues to use the PRODEFI model, and conduct training programs that use village resources and allows any participants. The possible reasons of why the Forestry Department in Nioro is that they had close relationship with the project such as collaboration in implementing training programs, this allowed them to directly observe the implementation of the training programs and the changes in the lives of villages as the result of the PRODEFI model. The director of the Nioro Forestry Department was newly assigned to the position one month before the time of this ex-post evaluation, and already observed that people who live in the PRODEFI villages are different from those living in other localities in their awareness of tree planting, and activeness in economic activities since he had opportunities to have conversation with people who live in the PRODEFI villages and come to his office to purchase seedling.

This situation that the Forestry Department in Nioro has sufficient understanding about the PRODEFI model and continues to use it suggests the following approach to encourage dissemination of the PRODEFI model in other regions: The Senegalese Government and donor agencies appoint their personnel to disseminate the PRODEFI model, let them stay in Nioro for a certain period of time, let them engaged in the implementation of the model, and

observe the changes in the villages. In this way, they can learn the model, and appreciate its usefulness. This approach would promote the dissemination of the model in other regions.

### 3.2.2 Impact

#### 3.2.2.1 Achievement of Overall Goal

The overall goal for both the main phase and the extended phase is “Action programs for sustainable management of natural resources are initiated and implemented by local populations.” The first indicator is the number of other donor organizations and NGOs that use the PRODEFI model, and this evaluation study did not identify any donor or NGOs having adopted the model. The second indicator is the number of those who learned knowledge and skills by the model and use it. From the previous discussion of situations where skills and knowledge of the training programs are disseminated by villagers, the number of villagers who were active in relevant areas, the number trees newly planted, in terms of the second indicator, the overall goal was achieved. From the above, in terms of the second indicator, the goal was achieved whereas in terms of the first indicator, it was not. Therefore, the impact is evaluated as fair.

#### 3.2.3 Impact Evaluation

This evaluation study undertook impact evaluation to examine the project effects. For this purpose, we randomly selected 200 households from both target villages and non-target villages, collected data by administering questionnaires, and analyzed the data with the method of impact evaluation. This section describes the results of the analyses. Details of data collection and analyses are in the column at the end of this report.

Promotion of tree planting was one of the main purposes of the project. However, the analysis of impact evaluation shows that the project did not directly promote tree planting activities. Knowledge and skills were important, but more important was whether they have resources such as fund and materials, and whether they can expect profit from tree planting.

The PRODEFI project emphasized training contents disseminated among villagers. In order to ascertain this effect, I examined the frequency of villagers advising others in tree planting. The result was that the respondents of the target village advise others on tree planting more frequently than those living in non-target village. This supports the evaluation results that the project achieved Output 4 of the main phase “The provisional extension model using the network of volunteer farmers is implemented,” and Output 4 of the extended phase “Extension model for sustainable natural resource management is being implemented by the network of trainees.”

Training programs of the PRODEFI project emphasized usefulness of cooperation among villagers. I examined the degree by which villagers have benefits of others' help in tree planting, and the result of the analysis shows that respondents living the target villages

have more benefits of others' help in tree planting those living in the non-target villages, and this indicates that the project promoted cooperation in tree planting among people in the target villages.

Training programs of the PRODEFI project emphasized usefulness of groups for economic activities. Target villages had various groups such as religious group, rural development groups, youth groups, women's groups, economic interest groups and others. The PRODEFI project emphasized the use of groups in economic groups and had trainings on group management. This evaluation study found that groups many villagers participate are religious groups and rural development groups. The numbers of respondents who belong to the religious groups are 58 out of 100 in the target villages and 49 out of 100 in non-target villages, indicating that there is not much difference. On the other hand, the numbers of respondents who belong to the rural development groups are 36 out of 100 in the target villages and 2 out of 100 in non-target villages, and it indicates the project effect in increasing participation in rural development groups.

PRODEFI training programs taught how to organize groups. In order to find out whether such training improved organization in general, I examined the degree by which villagers are active in group activities, and the degree by which leaders and members of groups in target villages are more cooperative for the purpose of the group. The results of the analyses are that respondents of the target villages are more active in group activity than those of the non-target villages, and leaders and members are more cooperative to serve group purposes, indicating that the project enhanced organizations in the target villages.

PRODEFI training programs emphasized cooperation among villagers and organization. One local resident who were interviewed stated that "although the relationships among the villagers were good, they did not collaborate for economic activities before the PRODEFI project. In the training program, we learned skills and organization with neighbors. As we collaborated in our work, our relationships have become closer." In order to examine whether this effect is diffused to the whole village, the result shows that the respondents of the target villages are more cooperative in general than those of the non-target villages, indicating that the project has impact on social relationships in general in the target villages.

#### 3.2.2.2 Other Impacts

Other impacts are promoted organizations within the target villages and enhanced cooperativeness among villagers as discussed in the section of impact evaluation,

#### 3.2.4. Summary of Evaluation

The project objective of the main phase was "the extension model of sustainable natural resource management is established in the targeted areas." The PRODEFI model was

accepted by the target villages in the extended phase and contributed to achievements of Output 2 (training module designed), Output 3 (training programs implemented), and Output 4 (extension of training contents). Thus the project objective of the main phase was achieved.

The project objective of the extended phase is “to implement the PRODEFI model as natural resource management extension model, improve it, and disseminate it in the target areas.” The indicator is extension model for sustainable natural resource management based on the extension network of the training program participants is available in English and French. Although the manuals of the model and other publications are available at JICA website and the manuals are given at seminars, these have not lead to diffusion of the model. Thus the project objective of extension phase is not achieved.

The indicators of the overall goal for both the main phase and the extended phase is the number of other donor organizations and NGOs that use the PRODEFI model, and this evaluation study did not identify any donor or NGOs having adopted the model. The second indicator is the number of those who learned knowledge and skills by the model and use it. The overall goal was achieved in terms of this indicator as the previous discussion of Output 4 and 5 mentioned the number of villagers who were active in areas for which they learned in the training program, and dissemination of the training contents by villagers. Therefore, the impact is evaluated as fair.

With regards to the recommendation by the terminal evaluation, although the Forestry Department in Niore continue to use the model developed by the project, Senegalese government did not approach other donors and NGOs to explain usefulness of the PRODEFI model so that these organizations may use the model.

From above, although the model was developed and used in the target area, it was not adopted by Senegalese government and donor organizations for dissemination outside the target area. This project has somewhat achieved its objectives, therefore its effectiveness is fair.

### 3.3 Efficiency (Rating: ②)

#### 3.3.1 Inputs

Main Phase (implemented directly by JICA)

<b>Inputs</b>	<b>Plan</b>	<b>Actual Performance</b>
(1) Experts	3 long-term experts (Specialization: social forestry, rural development, social survey/gender)  Short-term experts (as	8 long-term experts (Specialization: rural development, social forestry, gender)  9 short-term experts (Specialization: PCM method, extension educational method,

	necessary)	participatory extension method, conservation of farm land, survey for natural resource management, training for soil conservation, group management, measuring extension, dissemination method)
(2) Trainees received	2 trainees	9 trainees
(3) Third-Country Training Programs	None	None
(4) Equipment		
Total Project Cost	Yen	65,132 million yen
Total Local Cost	Land, buildings, vehicles	Land for Niro office and others Total: 1.5 million yen

Main Phase (Implementation by contracted consultants)

<b>Inputs</b>	<b>Plan</b>	<b>Actual Performance</b>
(1) Experts	1. Chief Advisor (Regional Development) 2. Soil conservation/social forestry/extension/public relations 3. Microfinance 4. Gender	8 long-term experts (Specialization: social forestry, project management, information/public relations, soil conservation, microfinance, social survey, gender, regional alliance, forestry management) 4 Short-Term experts
(2) Trainees received		4 trainees
(3) Third-Country Training Programs	None	None
(4) Equipment		Vehicles and others
Total Project Cost		216.71 million yen
Total Local Cost	Land, building, facilities Office for JICA experts Expenses for electricity, gas, water, telephone, purchase of furniture and others	Land Total: 8.24 million Yen

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### 3.3.1.1 Elements of Inputs

The plan of Japanese inputs in the main phase included three long term experts and short term experts as necessary, and the actual implementation required more than the plan as it had eight long term experts and nine short term experts. The plan for the extended phase included four experts that were to cover Chief Advisor/regional development, soil conservation/social forestry/extension/public relations, microfinance, and gender. The actual implementation of the extended phase had four long term experts and four short term experts. Thus, the actual had more experts than the plan.

As of inputs by the Government of Senegal, the agreement between Senegal and Japan for the main phase describes that the Senegalese government was to provide land, building, and vehicle, and the terminal evaluation reports that it provided 1.5 million yen and land. Thus, the actual is below the plan. As of inputs by the Government of Senegal for the extended phase, the plan was to provide land, buildings, facilities, and others, and the terminal evaluation reports that it provided land. Thus the actual is below the plan.

### 3.3.1.2 Project Cost

The actual total project cost provided by Japan was 651.32 million yen for the main phase and 216.71 million yen for the extended phase. Since the budget at the time of planning is not known, it is not possible to compare the plan and actual. However, the number of experts and other inputs are more than the plan to a large extent and this indicates the actual expenditure is likely to be more than the planned budget.

### 3.3.1.3 Period of Cooperation

The period of cooperation was extended by the implementation of the extended phase. The terminal evaluation of the main phase pointed out that the initial plan was not realistic and had to be modified to a large extent. The project objective in 2000 was “the dissemination of the model of social forestry and rural development by the local people as the main actors in the target area for soil recovery and ensuring availability of water,” and the outputs were to formulate manuals on skills and management, appropriate agricultural techniques are used, land management are improved among others. Senegalese government stated that after 2-year project implementation, the logical framework did not clearly define the responsibilities within the executing agency, and the relationship between activities and outputs, which resulted in redundancy in activities and delay in implementation. In response to these situations, Senegalese government and JICA agreed in 2002 that the project objective was changed to “The extension model of sustainable natural resource management is established in the targeted areas.” Accordingly, project outputs and activities were modified, and the extended phase was



implemented in order to achieve the initial objective. The agreement between Senegalese government and JICA planned the project duration of 5 years (60 months). The extended phase was implemented for 3 years and 3 months (39 months). The ratio of project period between the plan and the actual is 165% (99 months (actual)/60 months (plan)).

On the other hand, the PRODEFI model has unique features: Training programs are implemented in the target villages so that any villagers can participate in them, and resources such as trainers are supplied from the villages. In the process of reaching these unique features, trial and error was the necessary steps, which may delay some schedules. In the extended phase, the model was accepted in the target villages and demonstrates its effectiveness, and its practice still continues at the time of this evaluation study. From the above, the efficiency is fair.

### 3.4 Sustainability (Rating: ②)

The project final report described that the project aimed to achieve the sustainability in terms of two perspectives: The first perspective is that the people in the target villages continue to practice the natural resource management such as tree planting (sustainability in natural resource management activities) after the project completion. The second is the Senegalese government and other donor organizations use the PRODEFI model designed by the project. Below is the evaluation of sustainability in terms of these two perspectives.

#### 3.4.1 Institutional and Operational Aspects of the Implementing Agency

With regards to the operational aspects of the Niore Forestry Department, two forestry officers are engaged in implementing training programs and monitoring based on the PRODEFI model as part of their regular assignment under the supervision of Department Director. Six JOCVs are assigned, assuming important roles of monitoring and other activities in the PRODEFI villages.

From 2009 to 2010 after the completion of the project, the Forestry Department implemented training programs on the construction of frame dams in three villages, on managing seedling in nine villages, on bee keeping in three villages, and on tree planting in two villages.

The project staff of the PRODEFI established an NGO called PDL (Association Promotion pour le Development Local) and are engaged in expansion and improvement of implementing aspects of the PRODEFI model. PDL has the positions of President, Vice-President, Accountant, and Secretary. These positions are not paid, and PDL does not have stable source of the fund. PDL also does not recruit and train new personnel. After the completion of the project, PDL implemented training programs for 15 times of 6 kinds with 295 participants in 2008, 24 times of 6 kinds with 299 participants in 2009, and 5 times of 5 kinds

with 188 participants.

From the above, the operational arrangement to ensure sustainability in the natural resource management activities in the target villages is in order at present. However, at the Forestry Department, JOCVs assume important roles although their future assignments are not ensured, and PDL does not have any stable financial sources, and do not train new staff. These are the causes of some concern in future.

In terms of the perspective of dissemination of the PRODEFI model, neither Senegalese government nor other development organizations adopt and implement the PRODEFI model.

We asked a village chief whether villagers can disseminate the PRODEFI model, and he responded that villagers can teach knowledge and skills they learned in the training programs, but they cannot design, plan, prepare and implement the training programs based on the PRODEFI model.

### 3.5.2 Technical Aspects of the Implementing Agency

In accordance with the Niore Forestry Department and the information provided by JICA, forestry officers have sufficient knowledge and skills in areas such as seedling and tree planting. Technique to disseminate the PRODEFI model is also sufficient since the number of villages adopting the PRODEFI model increased from 30 to 54, and the training programs are conducted after the completion of the project.

In terms of the technique of the villagers, Table 9 concerns the result of the survey conducted for this evaluation with the chiefs of 30 target villages. It shows the average number of villagers who can train others in each area from 2008 when the project was completed to 2010. The numbers of villagers who can train in tree planting were 63.7 in 2008 and 91.1 in 2010. The numbers of villagers who can train in stone line were 28.9 in 2008 and 32.9 in 2010. These indicate the number of villagers who can train others in these areas continue to increase.

Table 9. The number of persons who can train others in each village (Average)

Area	2008 Number of persons	2009 Number of persons	2010 Number of persons
Tree planting	63.7	76.4	91.1
Seedling production & procurement	34.2	35.3	43.7
Charcoal production & selling	46.8	60.0	68.6
Stone line	28.9	29.1	32.9
Frame dams	16.4	19.9	23.0

Vegetable growing	47.2	53.8	53.6
Fruit and vegetable processing	47.6	50.8	56.5
Livestock fattening	17.9	18.9	23.3
Fruit tree	24.0	30.3	37.6

(Source: Survey conducted by the evaluator in February 2011 from chiefs of 30 villages.

The data are recall of the respondents, thus not accurate.

### 3.5.3 Financial Aspects of the Implementing Agency

The financial aspect of the Nioro Forestry Department is that they have the budget for fuel and maintenance for the vehicle provided by the project. However, the PRODEFI model is implemented together with other regular responsibilities, and has no separate budgetary provision.

### 3.5.4 Continuity of Effectiveness

Table 10 shows continuity of villagers' activity with the average number of people engaged in each activity. The numbers of those active in tree planting were 173.7 in 2008 and 198.8 in 2010, which is 14% increase. On the other hand, the numbers of those we grow vegetable were 74.1 in 2008 and 62.7 in 2010, which is 11% decrease. Whether or not the number of active villagers increases or decreases depends on the areas. The average numbers of all areas indicate that the number of active villagers increased from 2008 to 2010 by 4%

Table 10 The number of villages engaged in each activity (average)

	2008 Number of persons	2009 Number of persons	2010 Number of persons
Tree planting	173.7	181.0	198.8
Seedling production & procurement	97.4	64.5	74.3
Charcoal production & selling	50.8	58.5	71.0
Stone line	73.3	69.6	73.4
Frame dams	24.1	28.4	30.2
Vegetable growing	71.0	71.9	62.7
Fruit and vegetable processing	54.5	42.8	53.2
Livestock fattening	26.0	25.1	27.5

Fruit tree	39.6	36.7	38.4
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(Source: Survey conducted by the evaluator in February 2011 from chiefs of 30 villages.

The data are recall of the respondents, thus not accurate.

The evaluation study conducted the survey and asked chiefs of all 30 villages how effective the PRODEFI model is in the five scale (1=not effective at all, 2=not effective, 3=neutral, 4=effective, 5=very effective), and result was that the average of all the villages was 4.7. The same survey asked them how much the PRODEFI village increased income of the villagers in five scale (1=not increased at all, 2=not increased, 3=neutral, 4=increased, 5=much increased) and the result was that the average was 4.5.

The results of the above survey on the number of villagers active in each area, and the responses by the village chiefs on the PRODEFI model indicates sustainability of natural resource management activities in target villages is ensured. However, there is some concern of sustainability in future because of uncertainty in the operational arrangement as previously discussed.

In terms of the sustainability of the PRODEFI model, the number of villages participating in the PRODEFI model increased from 30 to 54.

The Niore Forestry Department continues to implement the PRODEFI model after the completion of the project and organized training in bee keeping in two villages which newly adopted the PRODEFI model, and organized tree planting in one village. In this sense, the PRODEFI model continues to be used. However, the evaluation study did not identify cases where the PRODEFI model was newly adopted. Before the completion of the project, some agreements of collaboration were made. In accordance with PDL, PROGERT (Project to manage and recover degraded soil assisted by UNDP and the Global Environment Fund) provided fund to purchase material necessary for trainings programs organized by PDL from 2008 to 2010 for 27 times in 10 villages. This does not mean that PROGERT adopted the PRODEFI model.

No Senegalese government organizations adopt the PRODEFI model other than the Niore Forestry Department. The government official who was assigned as the coordinator of the extended phase of the project is now Deputy Director of training center of the Forestry Department in Thies which is 70km east from Dakar, and he appreciates the effectiveness of the PRODEFI model, but is not using it in his duty at the present position.

The activities to disseminate the PRODEFI model at the extended phase were preparation of manuals and organization of seminars, but these have not materialized the adoption of the model by the Senegalese government or donor organizations. This demonstrates that even if an effective model is formulated and publicized, it does not mean that some organization may adopt the model and the model may be disseminated. In order to disseminate the model, publicity was not sufficient, and some arrangements for dissemination

were necessary, for which support of a decision maker of an organization or a section that may organize arrangements to disseminate the model is necessary. In order to have the arrangement for the model dissemination and support of a decision maker, there should have been appropriate outputs and necessary activities of the project.

### 3.5.5 Summary of Evaluation

The main purpose of the project is to formulate and disseminate a model for sustainable natural resource management activity, and the PRODEFI model was formulated but was not disseminated. The training programs are the key for the model and the contents are designed based on the needs of local people on various subjects such as tree planting, soil conservation, growing vegetable and others. They were held in the villages and did not select participants. This allowed many local people to participate in the programs and disseminated skills and knowledge to others, leading to sustainable natural resource management activity.

As for sustainability of natural resource management activity in the target villages, Director of the Forestry Department and Forestry Officers collaborate with an NGO established by the project staff, and organize training programs based on the PRODEFI model after the completion of the project. In this perspective, sustainability at present is ensured. However, there is some concern of sustainability in future since JOCVs have important roles in monitoring and other activities, and their assignment in future to Nioro is not certain.

The number of villages benefiting from the PRODEFI model increase from 30 at the time of project implementation to 54 since additional 24 villages joined from the vicinity.

In terms of the necessary technical level, the Forestry Department in Nioro has sufficient technical level. For the technical transfer of the PRODEFI model, diffusion of knowledge and skills among villagers is important. As the survey result showed, the number of villagers who can train others in various are increasing.

From the above, sustainability of natural resource management activity in the sense of natural resource management activities such as tree planting are undertaken by local people in the target area is ensured, although there is some concern for future. Although the practice of the PRODEFI model expanded in the neighboring villages, the adoption of model may not go farther than this since the model is not adopted by Senegalese government and donor agencies. The diffusion of the PRODEFI model is not ensured.

With regards to the recommendation by the terminal evaluation, diffusion of technique and monitoring are continued to ensure sustainability of activities by people of the target villages. However, there is no action taken to encourage other donors to adopt the PRODEFI model.

From the above, some problems have been observed sustainability of the project is fair.

## 4. Conclusion, Lessons Learned and Recommendations

#### 4.1 Conclusion

This project was implemented with the purpose of improving livelihood and promoting sustainable natural resource management with the participation of local populations in dry land of Senegal. The evaluation in terms of relevance of this project is high since it is consistent with Senegalese development policies, development needs, and Japan's ODA policy for Senegal. The evaluation in terms of effectiveness and impact is fair since PRODEFI model for sustainable natural resource management was developed, implemented and had achievements in target villages and their neighboring villages. However, this model was not disseminated beyond these villages. The evaluation of efficiency is fair since the initial plan of the main phase was excessive, and had to be modified in the later stage of the implementation, and the extended phase had to be implemented in order to reach the initial goal. The evaluation in terms of sustainability is fair. The project aimed to achieve sustainability in terms of natural resource management in the target areas, and dissemination of the PRODEFI model outside the target area, and the former was achieved and the latter was not. In light of the above, the overall evaluation of this project is evaluated partially satisfactory.

#### 4.2 Recommendations

##### 4.2.1 Recommendations to the Executing Agency

Effectiveness of the PRODEFI model in the villages are demonstrated and the Government of Senegal stated that the model is effective for the forestry protection activities by the local population. However, appreciation of its effectiveness is not sufficient for the model dissemination outside the Nioro area. Thus, an organization which can disseminate the model should assign its personnel to Nioro for a certain period of time to learn how to implement, and directly observe changes in working situations, and lives in target villages so that he/she can sufficiently appreciate its effectiveness and can be engaged in disseminating the model to other areas.

##### 4.2.2 Recommendations to JICA

The present situation is that the PRODEFI model does not go beyond Nioro areas and there is also some concern of sustainability in Nioro in the future as discussed in the section of sustainability. JICA should have discussion with the Government of Senegal to encourage assigning staff of extension organizations to Nioro so that they can have sufficient appreciation of effectiveness of the model.

#### 4.3 Lessons Learned

When a project has the objective of establishing a model and its dissemination, the effective way of promoting implementation and dissemination of the model by the government organization is to provide opportunities to experience the implementation of the model.

If officials of government organization which may disseminate the model participate in the formulation and implementation of the model, they can observe changes in reality, and this would significantly contribute to improving their motivation to disseminate the model to other areas.

Reason:

Although the PRODEFI model had good achievements, and is still used by the Forestry Department, an NGO, and the target villages in Nioro, it has not been implemented outside Nioro. The project prepared manuals, and organized seminars in order to publicize the usefulness of the model. However, it did not lead to dissemination of the model outside Nioro, and this indicated that publicity is not sufficient.

The possible reason why the Nioro Forestry Department continues to use the model after the completion of the project is that the Forestry Department directly observed the changes in the lives in the target villages through the cooperation in project implementation, and had sufficient appreciation of the meaning and effectiveness.

Capacity Development (CD) discussed by JICA recently is defined as the process by which capacity is developed to deal with problems at the multiple levels such as individuals, organizations and society. As the section of impact evaluation discussed, the PRODEFI model contribute to improving capacity not only at organizational level, but also organizational and community levels. Thus, the training style of the PRODEFI model can be effective in promoting CD.

## Column

### 1. Purpose

This evaluation study undertook impact evaluation to measure the project effects, taking into account unique features of the PRODEFI model. Training programs of this mode was implemented in the target villages, allowing any participants so that the skills and knowledge taught at the training programs would be broadly disseminated to the local population including those who did not participate in the programs. An example of this indirect effect of the project was discussed in the section of Output 4 of the main phase: members of a women's group who participated in the training program taught their members knowledge and skills they learned. Project effects to be examined are as below.

① To examine how much the promotion of tree planting, one of the main objectives of the PRODEFI project, was achieved.

② The PRODEFI project emphasized the dissemination of the training contents among participants in the village. In order to examine its effectiveness, I will examine how often villagers advise others on tree planting.

③ The PRODEFI project emphasized usefulness of cooperation among villages for tree planting and other activities. I will examine how much of cooperation with others villagers had for tree planting.

④ Target villages had various groups such as religious group, rural development groups, youth groups, women's groups, economic interest groups and others. The PRODEFI project emphasized the use of groups in economic groups and had trainings on group management. I will examine what effect such training had for improving group activities in the villages by examining ④-1 How actively villagers are engaged in the group activities they belong to, and ④-2 How cooperative leaders and members of groups respondents belong to for the sake of serving the groups

⑤ As described in project effect ④, PRODEFI training programs emphasized cooperation among villagers and organization. In the interview undertaken in the target village one resident stated that "Although the relationships among the villagers were, they did not collaborate to undertake economic activities before the PRODEFI project. In the training program, we learned skills and organization with neighbors. As we collaborated in our work, our relationships have become closer." In order to examine whether this effect is diffused to the whole village, I will examine how much villagers became cooperative with one another in



general.

## 2. Data Collection Procedure

For this impact evaluation, questionnaires were administered for data collection both at target villages and non-target villages. To make meaningful comparison of target villages with non-target villages, selected are 30 non-target villages similar to the target villages in terms of natural environment and socio-economic attributes such as economic activities and income.

The respondents to the questionnaires were selected by two-stage random sampling. First, 5 villages were randomly selected from target and non-target villages respectively, making 10 villages in total. Then, 20 households were randomly selected from each village, making 200 households in total. Household heads were the respondents of the questionnaire, and the data were collected from 1999 to 2000 for 12 years by the respondents' recollection.

## 3. Analytical Method of the Project Effects

This impact evaluation examines the project effect at the target villages, and this method requires careful examination of how such villages are selected since this selection process may bias the result of the examination. In selecting the target villages, the project staff visited candidate villages and organized meetings to explain about the project and selected the villages where people were willing to participate. Because of this selection procedure, the project effects that are previously discussed may not be solely attributable to the project. For example, villages willing to participate in the project may be more active in tree planting than non-target villages before the project implementation. Regarding the project effect ⑤ discussed above, the villagers may be already cooperative with one another and this may have facilitated consensus building to participate in the project. Table 1 is the comparison of project effects in 1999, one year prior to the project implementation. Project effects are put into numerical value and the numbers in the table are averages for respondents of target villages and those of non-target villages. This indicates that project effects are higher for villagers living in target villages than those living in non-target villages. I will explain the definition of numerical value of project effects later.

Table 1 Comparison of project effects  
between target villages and non-target villages in 1999

	Degree of activeness in tree planting	Degree of advising others	Degree of having benefits of others' help	Degree of activeness in group activities	Degree of cooperativeness of group leaders and members
Target	1.80	1.32	1.05	0.88	0.88

villages					
Non target villages	1.72	1.25	0.85	0.56	0.60

In order to have the precise examination of the project effect, it is important to remove the conditions which already existed in the villages before the project implementation. Instrumental variable method statistically removes such conditions which were not caused by the project implementation. For example, in order to identify the project effect in promoting activeness in tree planting, the degree of activeness in tree planting which already existed before the project has to be removed. For this purpose, I use two stage instrumental variable regression analyses.

In selecting the instrumental variable, it has to fulfill two conditions. Firstly, it has to be correlated with the chance that the village is selected as the target village. Secondly, it has only indirect effect on the project effect through target village.<sup>6</sup>

The instrumental variable here is “the strength of villagers’ willingness to take advantage of new opportunities.” If there are more villagers that are willing to take advantage of new opportunities, the probability that the village is selected by the project. Thus, this fulfills the first condition of the instrumental variable.

With regards to the second condition that instrumental variable should have only indirect influence on the project effect through being target village, I will examine for each project effect.

①”Degree of activeness in tree planting”

According to my interviews with villagers, they mentioned that many villagers attempted tree planting by themselves, but they could not continue because of salty soil and other problems. They continued to plant trees only after learning knowledge and skills to deal with these problems. In other words, they need to have knowledge and skills first, and just having willingness to take advantage of new opportunities does not mean that they are active in tree planting. Thus, the instrumental variable fulfills the second condition for this project effect.

② ”Frequency of advising others on tree planting”

In order to advise others on tree planting, they need to have knowledge first. Thus, just having willingness to take advantage of new opportunities does not mean that they can advise others. Thus, the instrumental variable fulfills the second condition for this project effect.

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<sup>6</sup> Eisenberg, Daniel and Brian C. Quinn. 2006 “Estimating the Effect of Smoking Cessation on Weight Gain: An Instrumental Variable Approach. Health Research and Educational Trust. 41:6 (December), p. 2258

③“Degree of benefits of others’ help in tree planting”

In order to have others’ help, they need to have someone who can help, or they have to be in a situation where they can be helped. Thus, people’s willingness to take advantage of new opportunities does not have direct influence on this project effect, and the instrumental variable fulfills the second condition.

④-1. “The degree of activeness by which respondents participate in group activities”

This depends on what kind of activities groups are engaged in. If a group continues with the traditional activities and do not engage in new activities, respondents may not be actively involved in group activities even if they are willing to take advantage of new opportunities. Thus, the instrumental variable fulfills the second condition for this project effect.

④-2. “The degree of cooperativeness of leaders and members of groups to which respondents belong”

This depends on group leaders and members, and the respondents’ willing to take advantage of new opportunities would not have direct influence on this effect. Thus, the instrumental variable fulfills the second condition for this project effect.

⑤”The degree of cooperativeness of villagers with one another”

This depends on people in the village, and the respondents’ willing to take advantage of new opportunities would not have direct influence on this effect. Thus, the instrumental variable fulfills the second condition for this project effect.

From the above, the second conditions to be an instrumental variable are met.

4. Variables

Next, I will discuss variables and their possible values. First, I will discuss variables for project effects, then, instrumental variable, and control variables.

4-1. Project Effects

To capture the project effects discussed above, I used below questions with the possible values in parentheses.

①How much active are you in tree planting? (5=Very active, 4=active, 3=fairly active, 2= not active, 1=not active at all)

②How often do you advise others in tree planting? (5=always, 4=often, 3=sometimes, 2=rarely, 1=never)

- ③ How much collaboration with others do you have in tree planting? (5=very much of collaboration, 4=much collaboration, 3=fair amount of collaboration, 2=no collaboration 1=no collaboration at all, 0=if not engaged in activities at all)
- ④-1 How much people in village are cooperative with one another? (5=much cooperative, 4=cooperative, 3=fairly cooperative, 2=not cooperative, 1=not cooperative at all)
- ④-2 The degree by which respondents are active in group activities (5=Very actively, 4=actively, 3=fairly actively, 2=not actively, 1=not actively at all)
- ⑤ The degree by which leaders and members of group the respondents belong to are cooperative with one another. (5=Very much, 4=much, 3=fairly, 2=not much, 1=not at all)

#### 4-2. Project Inputs

The PRODEFI project emphasized interactions of participants of training programs and non-participants for the transmission of training contents outside the training settings. In order to capture this broad process of project inputs, I will compare those living target villages where such interactions happened with those living in non-target villages where such interactions did not happen. Thus, the variable to capture this project input is whether a respondent lives in the PRODEFI target village. (1=respondents of target villages, 0=respondents of non-target village)

#### 4-3. Instrument Variable

The question and its possible values for the instrumental variable discussed above are as below.

How often did you try to take advantage of new opportunities such as training programs like PRODEFI to improve your life? (5=Always, 4=often, 3=sometimes, 2=once in a while 1=never)

#### 4-4. Control Variables

In order to control for the variable that may influence the project effects, I will include below control variables.

The degree of sufficiency of resources such as fund and material necessary for tree planting (5=Very much, 4=much, 3=fair, 2=not sufficient, 1=not sufficient at all), the degree by which they can expect profit from tree planting (5=very profitable, 4=profitable, 3=neither profitable nor unprofitable, 2=not profitable, 1=not profitable at all), age, literacy in French (1=literate, 0=illiterate), literacy in mother tongue (1=literate, 0=illiterate). The ethnic groups which respondents belong to are Wolof, Soninke, Sereer, Fulani, Manin and other groups. The analysis concerns the comparison between the ethnic group a respondent belong to and other ethnic groups.

5. Analysis: the first stage regression model

The first stage regression model concerns removing the conditions which are not project effect. The model can be captured by the below equation.

$$\begin{aligned} \text{Target village}_{it} = & \beta_{0t} + \beta_{1t} \text{opportunity}_{it} + \beta_{2t} \text{resource}_{it} + \beta_{3t} \text{profit}_{it} + \beta_{4t} \text{age}_{it} \\ & + \beta_{5t} \text{literacy(French)}_{it} + \beta_{6t} \text{literacy(mother tongue)}_{it} + \\ & \beta_{7t} \text{Wolof}_{it} + \beta_{8t} \text{Soninke}_{it} + \beta_{9t} \text{Sereer}_{it} \\ & + \beta_{10t} \text{Fulani}_{it} + \beta_{11t} \text{Maninka}_{it} + \varepsilon_{it} \end{aligned}$$

The variable to capture project input is “Target village<sub>it</sub>” and this indicates whether the village where a respondent<sub>i</sub> lives are the target village in year<sub>t</sub>. Opportunity<sub>it</sub> is the instrumental variable and indicates the degree of willingness to take advantage of new opportunities of a respondent<sub>i</sub> in year<sub>t</sub>. Resource<sub>it</sub> is the degree by which a respondent<sub>i</sub> has the sufficient resource such as fund and material in year<sub>t</sub>. Profit<sub>it</sub> is the degree by which a respondent<sub>i</sub> can expect profit in tree planting in year<sub>t</sub>. Age<sub>it</sub> is age of a respondent<sub>i</sub> in year<sub>t</sub>. Literacy(French)<sub>it</sub> concerns whether a respondent<sub>i</sub> is literate in French. Literacy(mother tongue)<sub>it</sub> concerns whether a respondent<sub>i</sub> is literate in his/her mother tongue. Wolof<sub>it</sub> concerns whether a respondent<sub>i</sub> is Wolof. If the respondent<sub>i</sub> is Wolof, this variable takes the value of 1 and Soninke<sub>it</sub>, Sereer<sub>it</sub>, Fulani<sub>it</sub>, and Maninka<sub>it</sub> take the value of zero. ε<sub>it</sub> concerns the error not explained in the analysis with regards to the factors that influence the village of respondent<sub>i</sub> becomes the target village.

Table 2 concerns the result of the first stage model, and “opportunity” instrumental variable (opportunity) is statistically significant (P<0.01) and shows that I can use it as the instrumental variable.

Table 2 First Stage Regression Model

Variables	Coefficient
Opportunity	0.05***
Resources	0.11***
Profit	-0.03**
Age	0.00***
Literacy (French)	0.06***
Literacy (mother tongue)	0.05**
Wolof	0.09
Soninke	0.08
Sereer	-0.12*
Fulani	0.02

Maninka	0.00
Intercept	-0.13
	***P<0.01   **P<0.05   *P<0.1

## 6. Results of the Second Stage Regression Analyses

Next are the results of the second stage regression analyses, and this shows whether project input has impact on the project effects. Table 3 shows the coefficients of each variable for each project effect. For the coefficients that are statistically significant, I put asterisks. I discuss the project effect as below.

### ① "Degree of activeness in tree planting"

It is not statistically significant. This may be because the degree of activeness in tree planting does not depend on whether they live in the project target village. More important is whether they have funds and materials necessary for tree planting.

### ② "Frequency of advising others on tree planting"

The analysis shows that the respondents of the target village more frequently advise others on tree planting than those living in non-target village ( $p<0.05$ ). This supports that the project achieved Output 4 of the main phase "The provisional extension model using the network of volunteer farmers is implemented," and Output 4 of the extended phase "Extension model for sustainable natural resource management is being implemented by the network of trainees."

### ③ "Degree of benefits of others' help in tree planting"

The analysis shows that respondents living the target villages have more benefits of others' help in tree planting those living in the non-target villages ( $p<0.05$ ), and this indicates that the project promoted cooperation in tree planting among people in the target villages.

④ The analysis shows that respondents living the target villages are ④- 1 more active in activities of group they belong to than those living in non-target villages ( $p<0.01$ ). It also shows that ④- 1 leaders and members of the group in target villages are more cooperative for the purpose of the group ( $p<0.01$ ), and this indicates the project enhanced organizations in the target villages.

⑤ The analysis shows that people living in the target villages are more cooperative with one another in general ( $p<0.01$ ), and this indicates that the project promoted cooperation among people in the target villages in general.

Table 3 Analyses of Project effects by Instrument variable method

	Active in tree planting	Advising others on tree planting	Benefits of others' help in tree planting	Active in group activities	Group leaders and members are cooperative	Villagers are cooperative
Target village	0.19	0.79**	0.48**	1.13***	1.06***	5.76***
Resources	0.12***	0.11**	0.48***	-0.08*	-0.08*	-0.80***
Profit	0.65***	0.35***	0.47***	0.11***	0.10***	0.36***
Age	0.00	0.00	-0.00	0.00	0.00	-0.01***
Literacy (French)	0.09**	-0.18***	-0.16***	-0.07	-0.07	-0.68***
Literacy (mother tongue)	0.11***	-0.27***	0.23***	0.51***	0.46***	0.03
Wolof	0.06	0.62**	0.00	0.08	0.03	0.20
Soninke	0.10	-0.00	-0.13	-0.81***	-0.91***	-0.15
Sereer	0.19	0.06	0.12	-0.35**	-0.44**	0.77*
Fulani	0.01	0.14*	-0.02	-0.18**	-0.20**	0.11
Maninka	0.14**	0.68***	-0.19**	0.11	0.11	0.62*
Intercept	0.88***	0.44	-0.03	0.88***	1.07***	2.90***

\*\*\* p<0.01    \*\* p<0.05    \* p<0.1

# The Enhancement of Sustainability in the Mangrove Forest Management of Saloum Delta In the Republic of Senegal

External Evaluator: Mayumi Hamada

Foundation for Advanced Studies on International Development

## 0. Summary

The Relevance of the project is high, as it is consistent with both the Senegalese development policy and development needs as well as Japanese aid policy. Also, the Efficiency is high as the elements of the Inputs are appropriate, and no problem can be seen in terms of duration and cost. On the other hand, as for the Effectiveness, due to the insufficiency in clarity and measurability in the Project Purpose, the Project Purpose cannot be determined to have been achieved. Regarding the Impact, although the Overall Goal has not been achieved, significant positive impact is observed compared to the situation before the project implementation such as the emergence of; a community spirit in each village, organizational management skills at the village level, a remarkable change of awareness, i.e., self-motivation and positivity, etc., in many target villages. Hence, the Effectiveness and Impact from a comprehensive perspective is judged as medium. The Sustainability is also judged as medium, because, although the sustainability of effects in the target villages is high, the diffusability to surrounding villages is not sufficient from a political, institutional, organizational, and financial perspective. For the above reasons, the evaluation result of this project is high.

## 1. Outline of the Project



(Map of the Project Site)



(The planted Mangrove)

### 1.1 Background of the Cooperation

The mangrove forest in Senegal is a precious ecological system to sustain biological diversity. However, factors such as decreasing rainfall since the 1970s and illegal deforestation by residents in surrounding areas have degraded and decreased mangrove forests which in turn has negatively influenced the resources required to sustain people's



lives as well as related industries which involve forestry, marine and tourism and has contributed to the deterioration of the environment.

In order to cope with this situation, the Senegalese government requested the cooperation of the government of Japan to investigate the sustainable management of mangrove forests in Petite Côte in The Region and Saloum Delta in Fatick Region located in mid-west of Senegal. In response to this request, the Japanese government implemented a JICA Development Study “The Survey on the sustainable management of mangroves in Petite Côte and Saloum Delta in the Republic of Senegal” from December 2001 to March 2005 for the purpose of planning a project for sustainable management of mangrove forests. In this survey, mangrove forests were categorized into two zones, conservation zone and restoration zone, and a pilot project was implemented. The results of the pilot project were reflected in specific plans for the conservation of mangrove forests. The plan also considered income-generation for the villagers by combining activities for income-generation and planting mangroves.

The government of Senegal requested the Japanese government to implement this project as part of its ongoing cooperation based on the above development study, and a Record of Discussions (R/D) was signed between the two governments on August 2005. JICA started this project on November 2005, in the form of subcontracting with JAFTA, Japan Forest Technology Association.

## 1.2 Outline of Cooperation

Overall Goal		Create the chance to know how to improve the living conditions of the population in the target area as the result of the sustainable management of mangrove forests.
Project Purpose		The population of targeted villagers will be enabled to utilize and manage the mangrove forest resources in a sustainable and diffusible manner.
Outputs	Output 1	1. The Population of targeted villages can regularly carry out their activities and use a part of the profits from these activities in order to conserve and to restore the mangrove forest.
	Output 2	2. The consciousness of the staff of administrators and the technical officers who lead the population will be raised.
	Output 3	3. The short and mid-term activities necessary to achieve the objectives for the sustainable management of mangrove forest resources will be well defined.
Inputs (achieved)		[Japanese Side] 1. Dispatch of Experts 5 persons (Total 33.5M/M)

	<p>Long-term Expert 1 person  Short-term Expert 3 persons</p> <p>2. Training of Counterparts in Japan 3 persons  3. Third-country Training None  4. Supply of Equipment Yen 4,770,000 (photo copy machine, PC, printer, fixed separator, hanging scale, etc.)  5. Local Cost Yen 121,130,000  6. Others (dispatch of final evaluation team, renovation of project office with the budget of JICA Senegal Office in FY2005)  [Senegalese Side]</p> <p>(1) Disposition of Counterparts 8 persons  (2) Preparation of land and facilities Project Office  (3) Local cost (only FY2007) FCFA 192, 500, 000</p>
Total Cost (Japan)	251,958 thousand yen
Duration	November 2005 ~ March 2008 (2 years and 4 months)
Counterpart Organization, etc.	Department of Water, Forests, Hunting and Soil Conservation, Ministry of Environment, Protection of Nature, Reservoirs and Artificial Lakes (Counterpart Organization), Department of Marine, Economy, Fishery and Aquaculture (Collaborative Organization in fishery field)
Collaborative Organization (Japan)	Japan Forest Technology Association (JAFTA)
Related Surveys and Projects	Sustainable Management Plan of Mangrove Forest, Development Study on Sustainable Management of Mangrove Forest in Petite Côte and Saloum Delta in Senegal ( JICA Development Study 2001.12-2005.2 ) , Dispatch of Follow-up Expert of Advisor for Sustainable Management of Natural Resources in Senegal (JICA 2008.9-2009.11), USAID/Wula Nafaa Project II (USAID 2009-2014)

### 1.3 Outline of Final Evaluation

#### 1.3.1 Probability of achieving Overall Goal at the Final Evaluation

It is indicated that the Overall Goal would be achieved to some extent, if support to monitoring and sustainability is appropriately provided and the Environment Fund functions properly. Relevant impacts also included; activated technology transfer at the villagers' level in and out of the target villages, emergence of new leaders through institution-building activities and an increase in cash income by improving existing

technology.

### 1.3.2 Probability of achieving Project Purpose at the Final Evaluation

It was judged that Project Purpose was almost achieved for the following reasons; 1) the Environment Fund had been set up in all the target villages, 2) the Environment Fund had been utilized at 2 of the 11 target villages, and 3) in the 9 remaining villages, the percent of profits to be given to the Environment Fund had been decided and utilization of the Fund could start as soon as any income was gained from the activities.

### 1.3.3 Recommendations at the Final Evaluation

The following recommendations were made.

- (1) Setting Framework of support by the Forestry Department in Dakar for securing sustainability
- (2) Securing substantial Personnel and Budget for (1) above and continued assignment of the Assistant Coordinator
- (3) Setting up a Coordination Committee consisting of concerned authorities which would include the Marine Department, and management under the leadership of the Forestry Department
- (4) Periodic Monitoring by authorities concerned including the Forestry Department, as well as clarification and implementation of necessary support
- (5) Support and Coordination based on monitoring of the Environment Fund by the authorities concerned
- (6) Follow-up technical assistance for Apiculture and Fish Cage, etc. by the Coordination Committee
- (7) Monitoring and management of progress by JICA together with the Forestry Department

Most of the above recommendations were not realized at the time of Ex-post Evaluation.

## **2. Outline of the Survey**

### **2.1 External Evaluator**

Mayumi Hamada

Foundation for Advanced Studies on International Development (FASID)

### **2.2 Duration**

Duration of the Survey: January 2011 to January 2012

Field Survey: February 14, 2011 to February 28, 2011

June 16, 2011 to June 30, 2011

### 2.3 Constraints on the Evaluation

Nothing in particular.

## 3. Evaluation Results (Rating: B<sup>1</sup>)

### 3.1 RELEVANCE (Rating: ③<sup>2</sup>)

#### 3.1.1 Consistency with Development Policy

The direction shown by the Project Purpose and the Overall Goal is consistent with the development policy of the Senegalese government from the start till the end of the cooperation period as follows.

Firstly, it is consistent with the Poverty Reduction Strategy Paper (2003-2005, hereinafter PRSP), as well as the Policy on the Forestry Sector (hereinafter PFS) at the time of project commencement. In the PRSP, the Senegalese government recognized “the management of natural resources and environment” as an important sector for long-term development. Also, the PFS, which was enforced in April 2005, indicates that the government would contribute to poverty reduction, meet the needs of people in consistency with the localization policy and maintain the balance between society and the ecology, by management and conservation of forestry resources and bio-diversity in a sustainable manner. Natural resources management, in particular, is recommended to be promoted using a participatory approach with the local population.

On the one hand, at the end of the cooperation period, the project is coherent with the Poverty Reduction Strategy Paper II (2006 – 2010, hereinafter PRSP II), Letter of Policy for Environment Sector (hereinafter LPSE) and the PFS. The PRSP II emphasized the importance of integrating economic growth with social development, based on four major pillars: 1) creation of wealth – for the sake of growth which contributes to poverty reduction, 2) acceleration of access to basic social services, 3) social protection, disaster prevention and management and 4) good governance and participatory and decentralized local development. Among these, the environmental sector is included in 2) above and recognized as important for long-term growth. It includes a description that actions should be taken for capacity development in regards to the sustainable utilization and management of natural resources, because natural resources had been deteriorated due to unsustainable usage. Also, the LPSE set the following five major tasks and objectives in the Forestry Sector; 1) capacity building in regards to the management of natural resources and the environment, 2) adding value from forestry and natural resources, 3)

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<sup>1</sup> Evaluation with 4 level-scale; (A)Very High/(B)High/(C)Partly Problematic/(D)Low

<sup>2</sup> ③: "High", ②:"Medium", ①: "Low"

actions for environmental conservation and prevention of desertification, 4) balancing protecting biodiversity and population's demands, and 5) actions for marine and coastal environment conservation. As for PFS, there has been no change since the commencement of the project.

### 3.1.2 Consistency with Development Needs

The direction shown by the Project Purpose and the Overall Goal is consistent with the development needs from the project commencement to the completion of the cooperation period for the following reasons.

At the start of the project, the content and the direction of the project are consistent with the social needs and the needs of the population for protecting Mangrove forests. The Mangrove forest is a precious ecosystem to maintain biodiversity and Senegal is said to be the northern limit for mangrove forests in North Africa,. Mangrove forests are prominent in, the lagoons, estuaries and the Delta in the southern part of the country encompassing 200,000 ha of mangrove area. In Saloum Delta's 58,300 ha of Mangrove forests spread out in the above area. Also, in addition to the function of providing construction materials, firewood and charcoal, and producing non-timber forest products such as honey, dyes such as tannin, medicine, and alcohol, mangrove forests nurture marine resources, protect coastal erosion and sediment run-off, purify water, conserve air quality and protect ecosystem (wild animals, birds and plants). The degradation and decrease of mangrove forests which provided such a variety of significant functions has been a serious problem, and its sustainable management has been an important task. Moreover, it was shown in the preceding development study that the local population was fully aware of the devastation of mangrove forests and the significance of its conservation.

At the time of the completion of the cooperation period, the content and the direction of the project were consistent with the development needs, as there had been no change in the significance of mangrove forests in terms of its importance to the ecosystem, its various functions as well as its sustainable management.

### 3.1.3 Consistency with Japan's Aid Policy

The direction of the Project was consistent with Japan's aid policy at the time of Ex-ante Evaluation for the following reasons.

At the time of planning, it was indicated in Japan's ODA Data Book that the environment sector including desertification protection is one of Japan's priority sectors in supporting Senegal, with which the project direction is consistent.

For the above reasons, the Relevance of the project is high, because implementation of the project is fully consistent with the development policy of the Senegalese government, the development needs of Senegal and Japan's aid policy.

### **3.2 EFFECTIVENESS and IMPACT (Rating: ②)**

#### 3.2.1 Effectiveness

##### 3.2.1.1 Project Outputs (Outputs)

The PDM of the project was revised once. The Outputs of the revised PDM were mostly achieved by the termination of the project, except in regards to the Environment Fund (accumulation and disbursement).

(1) OUTPUT 1 “The population of targeted villages can regularly carry out their activities and use a part of the profits from their activities to conserve and restore the mangrove forest.” Partially achieved.

Although by the end of the project cooperation period the population had acquired necessary skills for the income-generating activities, accumulation and disbursement of the Environment Fund were not sufficiently made by the project termination. The details are as shown below.

##### 1) The level of the acquired skill

As for the level of the skills required for income-generating activities, the villagers at the target villages are regarded to have mostly acquired the necessary skills as of the completion of the cooperation.

At the time of the Final Evaluation, it was judged that the people at the target villagers had acquired the skills of mangrove afforestation, village afforestation, shell culture and processing, glove/boot-making, life jacket production, etc. However, it was pointed out that continued technical support was necessary for the skills related to apiculture and fish cage which were new to the villagers. Meanwhile, according to the questionnaire survey and interviews at the time of ex-post evaluation, the forestry technical officers who were engaged with the project throughout the project implementation period until now recognize that the villagers mostly acquired a sufficient level of skills by the end of the cooperation period. Also, the interview results in all 11 target villages show that the villagers themselves think that they had acquired the skills by the end of the project.

Also, the revenue and profit from income-generation activities at the end of the project is shown in Table 1. Since a certain level of achievement is seen at 10 out of 11 target villages, the skills are regarded to have been mostly acquired by the villagers.

2) Establishment, accumulation and disbursement of Environment Fund

As for the establishment of Environment Fund and the accumulated/disbursed amount of the Fund, the accumulated amount at the time of project completion was 124,489 FCFA, while

**Table 1 The Revenue and Profit from Income-generation Activities at the project completion**

(Unit : FCFA)

	Name of the villages	Revenue	Profit
1	Mbam	448,000	105,000
2	Bassoul	371,000	8,500
3	Moundé	238,500	114,795
4	Kamatane Mbambara	210,000	67,650
5	Dassilamé Serère	189,000	72,720
6	Siwo	127,000	49,350
7	Bangalère	33,400	17,440
8	Gagué Cherif	16,000	6,000
9	Ndjambang	14,500	13,330
10	Djirnda	0	156,000
11	Sangako	0	0
Total		1,647,400	610,785

[Source] compiled by the author with materials provided by JICA

the disbursement was 30,000 FCFA in two of the 11 villages.

However, by the end of the project's duration, an Environment Fund had been established and the percent of the profit to be donated to the Fund (i.e., 25%) was decided in all 11 target villages. Moreover, many of the village organizations were almost functioning (regularly holding meetings, etc.), and the fundamental organizational management skills seemed to have been acquired as of the project's termination.

The reason that the objective concerning the accumulation and disbursement of the Environment Fund was not sufficiently achieved in contrast to the high level of skills acquired by the villagers, can be attributed to the insufficient length allowed for the project's cooperation period, i.e., 2 years and 4 months, rather than indicating that the villagers were having any problems conducting activities. Although technical verification at the village level was made in the target villages by JICA in its preceding

development study, 15 months was too short to verify the feasibility of some activities which require more than 15 months for technology transfer and the harvest cycle. Besides, pilot activities for Environment Fund were not included in the Study. Also, social and cultural aspects of the target villages as well as the time required to build awareness for change and institution building at the time of the study are regarded as being insufficiently analyzed.

In the first place, compared with technology acquisition, solidarity and management capacity as an organization are required for each village to manage Environment Fund and to conserve and restore mangrove forests. Since the population in the target villages used to conduct activities not as a whole village but in small groups (such as all women or all men), it is likely to take considerable time until the institution-building activities produce effects compared to areas which share a basic social background and have solidarity among villagers. Also, it takes a certain period until Environment Fund gets on track after acquiring skills, actually conducting income-generating activities, having revenue, reaching consensus among villagers on the percent of profits to be donated to the Environment Fund, monitoring the progress and modifying activities as necessary. Taking into account the fact that each component (such as income-generation by acquiring skills) needs to be one project, this project would need longer time for producing the planned effects compared with ordinary projects, and sufficient project duration should have been set at the time of planning.

(2) OUTPUT 2 “The consciousness of the staff of local administrations and the technical officers who lead population will be raised.” Almost achieved.

As for the forestry technical officers, appropriate support was given both in terms of quality and quantity during the project implementation period. In that process, the officers’ understanding on the villagers and the project activities was deepened, and their awareness was raised. According to the interview results, the frequency of their visit to the target villages during implementation period ranged from twice a week to once a month, depending on the area and time of the year. This is regarded as being sufficiently frequent for technical officers who are in charge of vast areas. On the other hand, the frequency of visits by the marine technical officers was low. They rarely visited the villages to conduct shell culture and undertake conservation activities, and no substantial contribution can be observed.

There was a comment in the hearing from technical officers that the project lead to the change in their relationship with the local population as it brought about mutual understanding and trust between the technical officers and the population as their



behavior improved with better knowledge acquired through the project activities. Before the project, the forestry technical officers considered the local population as an entity needing control, because they could not understand why the villagers took such unreasonable actions in regards to mangrove conservation.

(3) OUTPUT 3 “The activities and the objective to achieve in the short and middle term for the sustainable management of mangrove forest resources will be well defined.” Achieved.

By the end of the project cooperation period, action plans which cover the project period and three year afterwards were made at all 11 target villages. The content were explained at the village meeting and posted at the sign board at each village.

While the PDM of the project was revised, the specific information was not available concerning with the intension and the reason for its revision. However, the deletion of some outputs and their indicators are regarded to have been mostly appropriate.<sup>3</sup>

#### 3.2.1.2 Achievement of Project Purpose

The Project Purpose (The population of targeted villages will be enabled to utilize and manage the mangrove forest resources in a sustainable and diffusible manner.) cannot be described as being achieved.

(1) Indicator 1<sup>4</sup> ”State of mangrove forest resources in the targeted villages (such as the area of mangrove forest, quantity of fish that are caught, etc.)”: Not recognized to be achieved.

This indicator does not show the area of mangrove afforestation by the project but the total area of mangrove forest in the target villages. The target level is not shown, and the data on the area of mangrove forest of each target village did not exist at either the planning stage or at the time of project termination.

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<sup>3</sup>The deleted outputs in PDM1 are divided into two categories; 1) those which are hard to be monitored and evaluated because of difficulty to collect data (Indicator 1, Output 1 of PDM-1: “The villagers will participate at their own will and risk in the reforestation activities,” and Output 3 of PDM-1 :“The amount of consumed firewood is decreased,”) and 2) those which are unrealistic to be achieved within the project cooperation period (Indicator 2, Output 4 of PDM-1: stipulation of ordinances and laws concerning natural resources conservation).

<sup>4</sup> Although Indicator 2 (capacity of villagers and village organizations) and Indicator 3 (appropriate support and management by local government staff and technical officers ) for Project Purpose are described in PDM-2, they were not utilized in this survey because the former is the same as Output 1 and the latter as Output 2.

The amount presented in the preceding development study on the afforestation plan, (0.25 ha per year for *Rhizophora* and 0.1 ha per year for *Avicennia*) could be used as substitute target level of the indicators as the planned figure for each village. Applying these figures to the target villages according to the activities plan for each village, the total targeted area of afforestation would be 2.79 ha by the project until the project termination for 2.4 years. As the total area of mangrove afforestation by the end of the project was 1.67 ha, this would be about 60% achievement, which is not considered high. However, since the development study's target area includes an area broader than the target villages of this project, it is not clear enough that this figure is sufficiently applicable.

On the other hand, the area of afforestation was not commonly recognized as the major target in the Project Purpose by those who are concerned with the project. Substantially, it seems that conservation (or prevention of deterioration) of mangrove forest and its resources was the intended objective to be reached by ongoing activities. Even in this case, however, data which could be used to verify the achievement of the Project Purpose does not exist. At the completion of project cooperation, data for the amount of fish caught was also not available.

## (2) The relationship between the Project Purpose and the Outputs

As already indicated above, compared with other Outputs, Output 1 includes more items and contains many components, each of which could be an Output or a Project Purpose in other projects, such as institution building of village organizations, technology transfer for income-generation activities, which are also useful for maintaining mangrove forest, and for afforestation, income generation, establishment and management of Environment Fund, etc.

Among these components, acquisition of afforestation skills and institution building of village organizations directly contributed to increasing the area of afforestation, while successful technical transfer for income-generating activities during implementation stage kept the activities on track and helped establish a basis for mangrove conservation.

On the other hand, accumulation of and disbursement from the Environment Fund was not sufficiently on track by the end of the cooperation period, and did not contribute to the conservation of mangrove forest and resources.

Regarding the natural factors influencing the area of mangrove forest, some people suggest that soil salinity and soil erosion has a negative effect whereas others suggest increased rainfall has a positive effect. Hence, an Important Assumption is that natural

## PAGEMAS Molel: Self-supportive Management by Villagers as an Organization

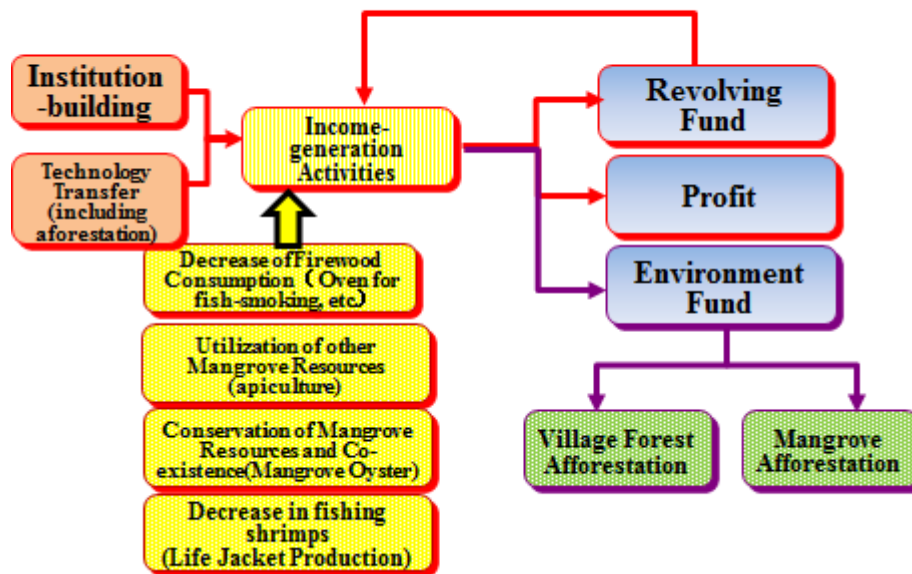


Chart 1 PAGEMAS Model

Source: by author based on the materials provided by JICA

Factors do not decisively influence the area of mangrove forest.

Based on the points mentioned above, I would like to consider the whole picture of the project again and analyze the reasons for not having achieved the project purpose. In the first place, the aim of this project can be understood to be the establishment of a model in which local people themselves conserve the mangrove forests self-supportively, in combination with 1) promoting income-generation activities useful for conserving mangrove resources and also useful for acquiring necessary skills, 2) establishment and management of an Environment Fund, for which parts of profits from income-generating activities are donated, and 3) afforestation utilizing the Environment Fund. At the end of the project, however, this model was not yet functioning. This can be attributed to the project's design which set a project duration which was too short. In a period of only 2 years and 4 months, so many objectives were set. It includes the sustainable management of an Environment Fund by the target villages which was meant to be achieved through awareness change of villagers and capacity building needed for organizational activities in the target villages where they did not have experience to conduct activities as a whole village as one unit before the project started.

Therefore, the Project Purpose is not verified as sufficiently achieved because the specific meaning intended was not clear enough, and appropriateness and measurability

of its Indicator were not sufficient.

### 3.2.2 Impact

#### 3.2.2.1 Achievement of Overall Goal

The Overall Goal (create the chance to know how to improve the living conditions of the population in the target area as the result of the sustainable management of mangrove forest) has not been achieved.

(1) Indicator 1 "State of mangrove forest resources at the surrounding villages (such as the area of mangrove forest, quantity of fish that are caught, etc.)": Not confirmed as the data did not exist to show the change in area of mangrove forest and amount of fish catch, etc.

There is no existing data on the mangrove forest area size and amount of fish caught in surrounding villages. During the implementation period, this project received visits from other target villages as well as surrounding villages, dispatching resident instructors, i.e., villagers who had already acquired the skill for income-generation activities, to surrounding villages, and inviting representatives from surrounding villages to the final workshop just before the project termination. The forestry technical officers also disseminated the results of the project and recommend that they learn from the surrounding target villages. Among the surrounding villages which were exposed to the information of the project, there was one village, Medina Sangako Village, which was able to increase area of afforestation, i.e., village forest. Medina Sangako village newly planted Eucalyptus because they had learned about the success the project had by planting village forest. However, they are not interested in establishment of Environment Fund. It is considered difficult to diffuse mangrove afforestation by establishment of Environment Fund, because neither increasing knowledge on the importance of mangrove forest nor institution building were provided to surrounding villages.

(2) Indicator 2 "Promotion of economic activities that contribute to the sustainable management of mangrove forest resources to surrounding villages.": Not considered as being achieved.

As for the income-generating activities, resident instructors visited surrounding villages as a part of the project activities for technology transfer of glove and boot making, receiving villagers from surrounding villages for afforestation skills, etc. However, these activities did not lead to sufficient acquisition of the target skills or their

utilization in surrounding villages.

On the other hand, five kinds of manuals developed by the project, i.e., oyster culture, shell culture and processing, improving oven for smoking fish, afforestation of *Avicennia* and afforestation of *Rhizophora*, are being used to help diffuse skills by the Wula Nafaa Project II (2008-2013) which is supported by USAID, and those skills are expected to be diffused in its project area<sup>5</sup>.

(3) Indicator 3 "State of extension to the surrounding of target villages for the sustainable management system of mangrove forest resources which is established in the targeted villages by the project.": Not extended.

At the time of ex-post evaluation, this indicator was not achieved. In other words, the model was not diffused to surrounding villages, i.e., afforestation based on the establishment of an Environment Fund linked with income-generation activities. Compared with the diffusion of income-generating activities, which has clear objectives that make it easy to motivate local populations in other areas, diffusion of the project's model requires an initial deep understanding of the importance of mangroves before further steps can be taken which include; the management capacity of an organization, financial management capabilities, consensus-making in the village, and establishing trust. Hence, where there is no such awareness change and capacity building already made, it is unrealistic to expect the model to be naturally diffused after termination of the project without any external support from either the government or donors. This project put emphasis on capacity development at the village level, and conducted activities intending that diffusion from village to village would occur during and after the project cooperation period. However, this way of technology transfer did not successfully diffuse the model. In order for the model to be diffused to surrounding villages, it would have been necessary to conduct activities, in parallel with income-generating activities, such as; establishing a sense of community, increasing knowledge and skills for institution building of the village organization to be the core of the activities, etc., and interference from outside the villages to promote those activities.

When diffusion of the project purpose was set as an Overall Goal, the project scope should have been broadened to minimize Important Assumptions, or risk factors, for achieving the Overall Goal based on an appropriate perspective based on sufficient analysis. If this was not possible due to realistic restrictions, long-term effect which can be expected in the target villages should have been set as the Overall Goal. The purpose

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<sup>5</sup>The target area of Wula Nafaa Project II consists of Tambacounda, Kedougou, Koulida and Ziguinchor, coastal zones and the delta region of the rivers in the Casamance and Sine-Saloum.

of Wula Nafaa Project mentioned before is to increase income of the population and does not include establishment of an Environment Fund.

For the above reasons, the Overall Goal has not been achieved at the time of ex-post evaluation, since the data for Indicator 1 is not confirmed, and the Indicator 2 and 3 have not been met.

### 3.2.2.2 Other Impacts

#### (1) Awareness and Behavioral change

In many target villages, a sense of community and solidarity as a village and significant attitudinal and behavioral changes such as taking actions before waiting for external support by the government or donors were observed. Also, some villages even expanded the function of Environment Fund and further utilize it for the community.

For example, in Moundé village, villagers initiated a new rule to provide a certain amount of oyster catch to the village organization and increased joint undertakings as a village organization, i.e., processing, seasoning, wrapping and sales. Financial management is properly made such that a person is put in charge of keeping books, and recording the quantity and sales amount of individual and joint undertaking respectively, while consensus-making and sharing information in the village meetings are regularly made. Moreover, the villagers have been taking positive actions such as going out of the village to search for new markets, asking for support for transportation cost to attend a Fair and packaging cost for expanding the sales amount. In this village, new tendencies (not seen before the project) can be observed such as collecting money for tax, repairing a mosque, electricity, and gas. Money is kept in the Fund for joint disbursement. They also consider new projects and tasks to undertake by themselves realizing that all the external support from donors will come to an end. This sort of tendency is a remarkable positive Impact brought about by the processes of institutional building and capacity development. This was made possible because the project's design allowed for institution building at the village level at all the target villages.

Including Moundé village, the project integrated institution building activities at the village level at all the target villages, and the capacity of the villagers was enhanced in numerous areas including; financial management; holding and facilitating meetings, discussing and setting strategic objectives, and understanding the importance of monitoring, etc. Awareness change and capacity building of the villagers were promoted by approaches to enhance the positivity of villagers such as self-evaluation workshops, presentation of activities at regional community<sup>6</sup> (hereinafter, CR) seminar,

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<sup>6</sup> regional community (CR) is under region, province and county in terms of local government structure, and

visit to other villages, etc. Also, the participatory approach (in which decision-making of future direction is made by the villagers themselves based on the discussions in the village meetings, etc.) contributed to the change<sup>7</sup>. This sort of project design can be considered the promoting factor for the remarkable behavioral change that took place. In addition, the follow-up dispatch of an ex-JICA experts who had established trust with the villagers lead to further capacity development and significant awareness change for institution building in addition to providing technical advice on afforestation by utilizing some Positive Approach management tools such as Action Learning and World Café.<sup>8</sup>

## (2) Policy Impact

The project is widely known not only in Foundiogne Province (where the target villages are located) but also in Fatick Region (which includes Foundiogne Province), and its positive effects such as its income-generation activities, the awareness change which has taken place at the village level, the strong initiatives taken by women, and the establishment and management of the Environment Fund have made a strong impression on people. Hence, the Regional Council of Fatick decided to commence a Community Management Program in November 2010 in order to promote the management of natural resources using a participatory approach<sup>9</sup>. This is a strong positive Impact from a policy perspective. This program aims at promoting forestry and marine resources including mangrove resources all over the region using a participatory approach with the budget from regional council and support from donors. It is remarkable that even before sufficient information was available and details were provided, the project influenced the new decision by the regional council.

As already stated above, even though this model did not diffuse naturally from village to village as it was initially expected, in terms of interference/external support for enhancing knowledge and awareness change, this model is regarded as highly effective. Although the Overall Goal has not been achieved, the remarkable positive impacts described above can be observed, and a policy impact has emerged as well. Negative impacts have not been observed.

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is responsible for supervising villages.

<sup>7</sup> Information from interviews with the target villagers

<sup>8</sup> Action Learning is a team approach method which simultaneously attempts to address both problem-solving and institution-building. It is known as “Question Meetings” in Japan, and is widely utilized in and out of Japan. World Café is a method for discussion in which participants have free conversations based on certain rules in a relaxed atmosphere to encourage creative ideas and wisdom. Both methods are defined as positive approaches (in a broad sense), in contrast to a gap approach, which tries to narrow the gap between the present problematic situation and the future desirable situation.

<sup>9</sup> According to the interview with Forestry Department of Fatick Region and Foundiogne Department.

As explained above, even though the Project Purpose (at the time of project termination) and the Overall Goal (at the time of ex-post evaluation) were not achieved (and the situation has not changed), significant positive impacts can be observed including: attitudinal and behavioral changes through institution building, and positive policy impacts. Therefore, the overall rating for Effectiveness and Impact is medium.

### 3.4 EFFICIENCY (Rating: ③)

#### 3.4.1 Input

Element of Inputs	Plan	Achievement (at the project termination)
(1)Dispatch of Expert	- Long-term 3 persons (R/D) < Breakdown> 1) Chief Advisor/Chief of the party (Forestry, Life resources management) 2) Deputy Chief Advisor (Liaison, Income-generation Activities) 3) Marine resources management/ Income-generation Activities	- Long-term 1 person - Short-term 4 persons ( Total 38.69 M/M) < Breakdown> 1) Chief Advisor/Chief of the party (Forestry, Life resources management) 3.8M/M 2) Deputy Chief Advisor (Income-generation Activities 1) 14.66M/M 3) Marine resources management (Oyster culture)/Income-generation Activities 2 9.4M/M 4) Income-generation Activities 3 ( Institution-building) 5.66 M/M 5) Interpreter 5.17 M/M
(2)Training in Japan	As necessary	3 persons
(3)Third-country Training	Not in particular	None



(4)Equipment Provision	Major Equipment: Equipment necessary for project implementation, spare parts, cars, etc.	Major Equipment: photo copy machine, PC, printer, fixed Separator, hanging scale, etc.
Total cost from Japan	N/A	Total: 251,950,000 Yen
Total input from recipient government	N/A	<u>Total: 192,500,000 FCFA</u>

#### 3.4.1.1 Element of Inputs

##### (1) Dispatch of Expert

As for the dispatch of experts at the planning stage, only three fields are shown in R/D, while its targeted figures were 39.37 M/M. Compared with this, five experts were actually dispatched for a total of 38.69 M/M, which is within the range of planned volume.

##### (2) Training in Japan

At the planning stage, training in Japan was described “as necessary,” and three counterparts were received as trainees. The theme of the training was “Policy concerning the Participatory Approach in Natural Resources Management, “and one counterpart was dispatched every year.

##### (3) Equipment Provision

Main equipment provided included: photocopy machine, PC, printer, fixed separator, hanging scale, etc.

The project concluded a sub-contract with a local consulting company in order to conduct activities in the 11 target villages which were scattered across a wide area and which included both inland areas and islands.

#### 3.4.1.2 Total Cost

The total cost from Japanese side was Yen 251,950,000. Although the amount planned at the initial stage is not clear, the total actual amount of the sub-contract, which shared 96.8% of the total cost, is 97.8%, and this amount is within the range of the contract amount.

#### 3.4.1.2 Cooperation Period

The cooperation period of the project was as scheduled: from November 2005 to

March 2008 (2 years and 4 months).

With all the information above, Efficiency is high because the inputs are appropriate for the outputs produced, while the total cost was within the planned range and the duration was as scheduled.

### **3.5 SUSTAINABILITY (Rating: ②)**

#### **3.5.1 Policy and Institution Aspects**

At the time of ex-post evaluation, the project was highly consistent with both central and local policy and institutional aspect with some exception.

There has been no change in PRSP II<sup>10</sup> and PFS which were consistent at the project planning stage. In “The Letter of Environment and Natural Resources Sector Policy” (2009-2015, hereinafter, LPSEN), which updated the LPSE, “securing rational management of environment and natural resources” was set as the objective for 6 years, and three strategic directions were shown as follow; 1) increase in basic knowledge on environment and natural resources, 2) strengthening the fight against degradation of environment and natural resources, and 3) enhancement of organizational and technical capacity of those who are concerned with the environment and natural resources. Among these, item 2 above shows prevention of degradation of forestry resources.

At regional level, Regional Council of Fatick decided to promote the Community Management Program from November 2010 as already explained. This program is not a project with a time limitation but implemented without limited duration with budget from the regional council as a part of its policy, which shows a high degree of consistency with local policy.

On the other hand, in the marine field, Senegalese government subsidies to Chinese life jacket manufacturers has been hampering the income-generating activities related to life jacket production and sluggish sales has led to a stop in production. Two of the target villages, therefore, have too much stock and cannot continue production. Among the two, Mbam village tried several times to apply for a subsidy but had not been granted a subsidy as of the time of ex-post evaluation, and the possibility for continuing production in the future is not clear. The failure of realizing the recommendation given at the final evaluation to “set up a comprehensive coordinating committee involving Fishery Department” has been negatively affecting Sustainability.

#### **3.5.2 System of Counterpart Organization**

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<sup>10</sup>PRSP II was originally effective until 2010, but it seems to be still valid at the time of ex-post evaluation because the next version is still at the planning stage.

Since the project put most emphasis on institution building and capacity development at the village level, involvement of the DEF/CCS, i.e., Forestry Department at Dakar, and its branch offices including the Forestry Department at Fatick Region, at Foundiougne Department, etc. during implementation period was insufficient. However, branch offices of the Forestry Department will cooperate on the implementation of the Community Management Program as explained before, and it is probable that a support system will be improved at the regional, departmental and district level if the program is steadily implemented.

At a district level, the Forestry Technical Officers support to the target villages are meeting their needs, since they have been providing small equipment such as pots for planting and giving appropriate advice even after the project termination, although the frequency of visits decreased to the same level as other villages<sup>11</sup>. The major reason that the decrease in the frequency of visits to the target villages has not had a negative effect on afforestation in the target villages is due to a sufficient improvement in the villagers' afforestation skills. In some of the villages where awareness change as a result of project activities could be observed, villagers, now, not only wait for the visits of the Technical Officers but representatives of the village make visits to the Technical Officers when necessary on their own initiative, to ask for advice and to receive provision of small equipment such as pots needed for afforestation<sup>12</sup>. Some Forestry Technical Officers have been trying to coordinate and resolve problems in fields outside the forestry field, such as oyster culture, etc., and disseminating information on the experience and results of the project to surrounding villages.

On the other hand, Technical Officers under the Fishery Department, Ministry of Marine, Economy, Fishery and Aquiculture, have rarely visited. Since the ministry or department in Dakar did not inform its local branch offices regarding the project in the beginning, some Fishery Technical Officers were not even aware of its existence. A Fishery Officer who cooperated with the project during implementation period, gave support not because he was instructed to by the upper organization but only in reaction to requests from parties concerned with the project. Therefore the possibility of future involvement by Fishery Technical Officers is very low. However, no significant influence is observed since their involvement was minimal during implementation stage, and the villagers have been conducting activities to increase income by themselves (without the help of Fishery Technical Officers). The problem is that the lack of the Fishery Department's involvement comes not from the local level but from the central departmental level and this is now negatively affecting income-generating activities

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<sup>11</sup> According to the interview with the target villagers

<sup>12</sup> According to the interview with the villagers at Mbam

related to life jacket production and sales.

### 3.5.3 Skills of Counterpart

There should be no problem regarding the capacity of the Forestry Technical Officers to teach and advise on afforestation at the sites, as it is recognized as sufficient by both the Forestry Department and the local population. Technology transfer (except in regards to afforestation) was not the task of the Forestry Technical Officers but of the local apiculture unions and the Japanese expert (fishery). Although the role of the Forestry Officers were limited to technical support mainly in afforestation and general monitoring, advice and coordination, there is no specific problems in the target villages on this point either, as the acquisition of skills for income-generation activities were almost completed by the end of project cooperation period.

In the meantime, the project put priority on improving villagers' skills and intended that the model would diffuse to surrounding villages by way of the villagers in the target villages. As the role of Forestry Officers is limited (as mentioned above), there is no problem in technical support for afforestation, but it is supposed to be difficult for the Forestry Officers to provide technical guidance in regards to the fishery field, and to be facilitators in institution building activities helping to arouse the attitudinal and behavioral changes essential for diffusing the model. The skills at villagers level is shown in 3.5.5 below.

### 3.5.4 Finance of Counterpart

As for the prospects of obtaining ongoing budget for sustainable management of mangrove forest in the target area: clear answers were not given by the Forestry Department in Dakar. On the other hand, the Forestry Departments at Fatick Region and Foundiogne were hopeful, pointing out that budget from Fatick Regional Council and from donors for Community Management Program will be given. However, details of the programs' content and budget were not clear enough and sufficient information was not available on the involvement of the organization concerned and its long-term framework. Although the district office of the Forestry Department has not received sufficient information, the Community Management Program, which was commenced in November 2010, has already started by appointing a contact person at each CR from June 2011. However, the regional council's budget is said to be rather abundant, which is a positive factor to help diffuse the model in the future since this sort of budget could be utilized for extension in the whole Region.

While the continuation of the project effect at the target villages will be described in 3.5.5, financial uncertainty of the administration is not a significant hindrance to the

continuance of project activities, because the project put priority on developing the capacity of villagers and village organization, and the villagers had acquired basic skills by the end of the project.

### 3.5.5 Continuance of Effects

#### (1) Income-generation Activities

##### 1) Skills of the Villagers

The level of skills acquired by the villagers is generally high, and they have been conducting activities with sufficient level of skills maintained. Skills needed in regards to apiculture and fish cage were regarded to be insufficient at the time of Final Evaluation. However, at the time of the Ex-post Evaluation, the apiculture skill of the villagers were sufficiently acquired, and properly utilized. The reasons contributing to skills being sustained include: conducting a survey and trial (pilot project) during the development study (mentioned above), and providing proper technical guidance during implementation period. Also, the reason those skills have been utilized after the project's termination is that the villagers are now able to conduct activities systematically as an organization (in contrast with the situation before the project) as a result of the institution building activities conducted at all of the target villages during the project implementation period. As for the fish cage, however, it was left without being utilized for reasons to be explained later.

With regard to the maintenance of the skills acquired, there should be no problem. Also, as explained before, five target villages (Sangako, Mounde, Siwo, Djirnda, Bassoul) are included in the target area of Wula Nafaa Project II (2008-2013) which is supported by USAID, while there is possibility that two more target villages, i.e., Ndjambang, Dassilamé Serère, will be included. In these villages, maintenance of the skills acquired



(Fish-smoking activity utilizing improved Oven)



(Product of Shell Processing/Cooking)

can be expected as training will be provided utilizing the manual developed by the project.

## 2) Revenue from Income-generating Activities

The revenue from the income-generating activities at the time of the ex-post evaluation is shown in Table 2. The total accumulated revenue was 311,681,000 FCFA and profits were 67,372,844 FCFA.

As for village-wise revenue, both Siwo village and Moundé village were remarkable, showing a sharp increase after November 2011. The sales amount from smoking fish in Siwo and processing/cooking shellfish in Moundé significantly increased. The common points observed in both villages are as follows;

- Institution building by the project which aroused a sense of community and solidarity was successful and the working committees are functioning sufficiently under their leader.
- There is a person in charge who can keep appropriate records of the Environment Fund such as sales and finance.
- There is trust among the villagers in regards to the fund's financial management.
- The villagers are keen to ensure sustainability.
- They have attitude and capacity to consider the village's future development under their own initiative, combining support from donors as needed (e.g., both villages receive support from Wula Nafaa Project for transportation cost incurred in order to join a fair).

In addition to the above points, in Siwo village, villagers tend to utilize the skills acquired and to further develop those skills by themselves, while in Moundé, villagers have enacted a rule (under their own initiative) to donate a certain amount of income generated individually in order to undertake activities which would make individual and community activities more compatible.

On the other hand, the future prospects are unclear for those villages that have only one stagnant income-generating activity. In Kamatane Bambara village and Mbam village which have only one income-generating activity (i.e., life jacket production and sales), although people acquired a high level of skill during the project implementation period and succeeded in producing high level products, production stopped after sales dropped due to the government subsidies that were granted to Chinese life jackets. Especially in Kamatane, successful institution building and remarkable awareness change can be observed, and Mbam tried several times to apply for the governmental subsidy, but

Table 2 Sales Amount from Income-generation Activities per village

(Unit : FCFA)

	Name of Target Villages	Sales Amount			
		A. During Project Period	B. Aft termination until dispatch of F/U Expert	C. After dispatch of F/U Expert until Ex-post Evaluation	Total
		(NOV 2005-MAR 2008)	(APR 2008 - mid-NOV 2009)	(late NOV 2009 - FEB 2011)	(NOV 2005- FEB 2011)
1	Siwo	127,000	0	250,951,050	251,078,050
2	Moundé	238,500	623,100	53,986,250	54,847,850
3	Bassoul	371,000	258,000	2,358,000	2,987,000
4	Djirnda	0	153,000	1,035,000	1,188,000
5	Mbam	448,000	0	10,000	458,000
6	Kamatane Mbambara	210,000	200,000	9,000	419,000
7	Ndjambang	14,500	297,000	0	311,500
8	Dassilamé Serère	189,000	0	45,000	234,000
9	Bangalère	33,400	100,700	7,500	141,600
10	Gagué Cherif	16,000	0	0	16,000
11	Sangako	0	N/A	N/A	0
	Total	1,647,400	1,631,800	308,401,800	311,681,000
[Source] A and B: from materials provided by JICA, C: from interviews at the target villages					
[Remarks]					
1.As for C. of Bassoul, products of fish-smoking was still on market at the time of Ex-post Evaluation, and there will be no deficit if all the products are sold out as it used to be (Expected Sales amount: 3,045,600 CFA, Expected Profit: 38,860 CFA).					
2.The unclear or figures unknown or unclear due to lack of record is not included in the above figures. For example, oyster culture and shell-cooking is not included in the figures, because specific figures were not available for C. period as the record was missing.					

the situation has not improved. In Gagué Cherif, where the recommendation at the final evaluation to give technical support of fish cage activities, the cage has not been utilized primarily due to the lack of motivation on the part of the villages who understand that the cage can most likely not be able to catch sufficient amount of fish because it is too heavy for them to put it sufficiently far from the shore. In these villages, no promising alternatives have been found to generate income which is a negative factor in terms of sustainability.

In terms of each activity, shell-processing and fish-smoking (improved oven) are generally going well but mangrove oyster culture and eco-tourism are not (Table 4). In some villages, villagers lost their motivation in the case of mangrove oyster production, profits are considered unattractive because the volume decreases when cooked. Although these villages hope to sell fresh oysters, they do not have the necessary skills and equipment. There are some other villages that, with the support of JOCV, have succeeded in selling fresh oysters. In Dakar, for example, villagers are able to utilize a fish pond owned by the Senegalese government. Although other villages would like to

Table 3 Profit from Income-generation Activities per village

(Unit : FCFA)

	Name of Target Villages	Profit Amount			
		A. During Project Period	B. Aftr termination until dispatch of F/U Expert	C. After dispatch of F/U Expert until Ex-post Evaluation	Total
		(NOV 2005-MAR 2008)	(APR 2008 - mid-NOV 2009)	(late NOV 2009 - FEB 2011)	(NOV 2005- FEB 2011)
1	Siwo	49,350	0	65,750,449	65,799,799
2	Djirnda	156,000	220,000	242,000	618,000
3	Dassilamé Serère	72,720	0	193,250	265,970
4	Moundé	114,795	78,600	46,000	239,395
5	Sangako	0	165,000	47,000	212,000
6	Mbam	105,000	0	5,000	110,000
7	Bangalère	17,440	48,000	7,500	72,940
8	Kamatane Mbambara	67,650	0	0	67,650
9	Ndjambang	13,330	0	0	13,330
10	Gagué Cherif	6,000	0	0	6,000
11	Bassoul	8,500	108,000	-148,740	-32,240
Total		610,785	619,600	66,142,459	67,372,844

[Source] A and B: from materials provided by JICA, C: from interviews at the target villages

[Remarks]

1.As for C. of Bassoul, products of fish-smoking was still on market at the time of Ex-post Evaluation, and there will be no deficit if all the products are sold out as it used to be (Expected Sales amount: 3,045,600 CFA, Expected Profit: 38,860 CFA).

2.The unclear or figures unkwon or unclear due to lack of record is not included in the above figures. For example, oyster culture and shell-cooking is not included in the figures, because specific figures were not available for C. period as the record was missing.

use this same pond, space is limited and the villages presently using the pond are highly unlikely to allow the participation of new villages. Almost all Eco-tourist activities have been suspended because many of the trained eco-guides are no longer available for reasons which include: moving out of the village, getting married, and withdrawing from the village organization to become independent.

As for future revenue prospects, any drastic expansion of production will be difficult unless a new market in a medium-sized city can be found. Many of the products that are being sold in the surrounding villages can be maintained near current levels in line with expectations based on the current activities/villages which are already on track. In contrast with the high level of acquired skills, market access and sales marketing capacity are low, which hinders any further increase of income. Since Wula Nafaa Project includes training activities on marketing, there is a possibility that marketing capacity will be improved in the target villages of PAGEMAS which are now included in Wula Nafaa Project as a complementary



effect<sup>13</sup>.

Table 4 Revenue from Income-generation Activities per activity in the target villages  
(Total amount from project commencement to ex-post evaluation)

(Unit: FCFA)

	Income-generation Activity	Sales Amount	Profit	Name of Village	Breakdown of Sales Amount	Breakdown of Profit Amount
1	Protection of Small Shells/Improvement of Shell Processing	54,951,750	589,110	Bangalère	77,100	17,440
				Moundé	54,357,350	132,100
				Siwo	517,300	439,570
3	Mangrove Oyster Culture	0	212,000	Ndjambang	0	0
				Sangako	0	212,000
4	Life Jacket Production and Sales	877,000	177,650	Kamatane Mbambara	419,000	67,650
				Mbam	458,000	110,000
5	Apiculture	962,500	236,830	Bangalère	64,500	55,500
				Djimda	333,000	122,000
				Moundé	253,500	46,000
				Ndjambang	311,500	13,330
6	Fish-smoking (Improved Oven)	254,402,750	65,823,989	Siwo	250,560,750	65,360,229
				Bassoul	2,987,000	-32,240
				Djimda	855,000	496,000
7	Diversification of fishing activities (Fish Cage)	16,000	6,000	Cagué Cherif	16,000	6,000
8	Eco-Tourism	471,000	327,265	Dassilamé Serère	234,000	265,970
				Moundé	237,000	61,295
	Total	311,681,000	67,372,844		311,681,000	67,372,844
	[Source]	compiled by the author with the materials provided by JICA and interviews with villagers				
	[Remarks]	Fish-smoking at Siwo was not included in the initial plan.				

## (2) Environment Fund

The amount of accumulation and disbursement in each village from the project's termination till the ex-post evaluation is shown in Table 5. Although it differs depending on the village, the amount is generally increasing, and many villages show a constant increase. On the other hand, in some villages, revenue from income-generating activities has stagnated, or a large amount of revenue has not lead to a corresponding accumulation in the Environment Fund. In some of the target villages, some uncertainties in regards to the future prospects of the Environment Funds can be observed, because the Funds prospects are closely linked to an increase in revenue from income-generating activities, management capacity of village organizations, and establishment of solidarity and trust among villagers.

<sup>13</sup> Wula Nafaa Project includes 5 of the PAGEMAS target villages (Sangako, Moundé, Siwo, Djirunda, Bassoul). It has possibility of including two more target villages (Ndjambang, Dassilamé Serère) in the future.

Table 5 Accumulation and Disbursement of Environment Fund  
(Total amount since project commencement till ex-post evaluation)

(Unit : FCFA)

The Amount Accumulated and Disbursed for Environment Fund									
	Name of Target Villages	Accumulated Amount				Disbursed Amount			
		A. During Project Period	B. After termination until dispatch of F/U Expert	C. After dispatch of F/U Expert until Ex-post Evaluation	Total	A. During Project Period	B. After termination until dispatch of F/U Expert	C. After dispatch of F/U Expert until Ex-post Evaluation	Total
		(NOV 2005- MAR 2008)	(APR 2008 - mid- NOV 2009)	(late NOV 2009 - FEB 2011)	(NOV 2005- FEB 2011)	(NOV 2005- MAR 2008)	(APR 2008 - mid- NOV 2009)	(late NOV 2009 - FEB 2011)	(NOV 2005- FEB 2011)
1	Bangalère	6,435	13,800	0	20,235	0	13,800	0	13,800
2	Bassoul	0	0	38,800	38,800	0	0	0	0
3	Dassilamé Serère	18,180	41,000	199,750	258,930	0	0	133,000	133,000
4	Djirnda	25,000	115,000	90,000	230,000	5,000	115,000	0	120,000
5	Gagué Cherif	1,500	0	0	1,500	0	0	0	0
6	Kamatane Mbambara	16,912	84,275	134,825	236,012	0	800	26,675	27,475
7	Mbam	26,250	65,000	0	91,250	0	0	29,500	29,500
8	Moundé	14,545	5,000	451,166	470,711	25,000	5,000	0	30,000
9	Ndjambang	3,332	83,000	60,000	146,332	0	3,000	60,000	63,000
10	Sangako	0	10,500	34,000	44,500	0	1,500	0	1,500
11	Siwo	12,335	42,300	0	54,635	0	3,800	334,000	337,800
	合計	124,489	459,875	1,008,541	1,592,905	30,000	142,900	583,175	756,075

[Source] A and B: from materials provided by JICA, C: from interviews at the target villages  
[Remarks]  
1. The figures include direct disbursement from profits before accumulating the amount in the Environment Fund.  
2. The figures include the amount kept by Village Chief before deposit to the bank.

### (3) Afforestation

Although the target level of the Project Purpose is not clarified as already explained, if we apply the estimation shown in the preceding development study to a larger target area, the target figure of afforestation by the end of the project duration is 2.79 ha, and 6.4 ha by 3 years after termination. The area of mangrove afforestation has been increasing even after the project's termination<sup>14</sup>. Although there is no quantitative data available,

<sup>14</sup> Although the amount of all the target villages totals to 754%, which significantly exceeds the target level for 3 years after termination, only Ndjambang village shows an extraordinary amount, and the reasons for the remarkable differentiation from other villages in this survey- could not be clarified. On the other hand, even if excluding the amount of Ndjambang (0.76ha), the target at the time of ex-post evaluation (6.4ha)

many villagers in the target villages claim to have seen an increase in the number of small fish under mangrove trees<sup>15</sup>.

Table 6 Area of Mangrove Afforestation in the Target Villages

					(Unit : ha)
		A. During Project Period	B. Aftr termination until dispatch of F/U Expert	C. After dispatch of F/U Expert until Ex-post Evaluation	Total
		(NOV 2005-MAR 2008)	(APR 2008 - mid-NOV 2009)	(late NOV 2009 - FEB 2011)	(NOV 2005- FEB 2011)
1	Bangalère	0.35	0.01	0.00	0.36
2	Bassoul	0.00	0.00	2.00	2.00
3	Dassilamé Serère	0.00	0.00	0.83	0.83
4	Djirnda	0.06	0.09	0.00	0.15
5	Gagué Cherif	0.48	0.00	0.00	0.48
6	Kamatane Mbambara	0.00	0.00	0.00	0.00
7	Mbam	0.00	0.00	0.00	0.00
8	Moundé	0.00	0.00	0.00	0.00
9	Ndjambang	0.38	0.25	44.00	44.63
10	Sangako	0.41	0.20	2.00	2.61
11	Siwo	0.00	0.00	0.00	0.00
Total		1.68	0.55	46.00	51.06
[Source] A and B: from materials provided by JICA, C: from interviews at the target villages					
[Remarks]					
1. In case area of forest was not available but the number of seeds or trees were available in the interview result, the figures were converted into area of forest based on the planting interval promoted by this project, i.e., 50cmx50cm, which makes 40,000 seeds or trees 1ha.					
2. In Bassoul and Dassilamé Serère, 2.0ha and 0.83ha of Reizophora were planted respectively from late November 2009 till February. These are included in the above figures, although Reizophora was not included in the initial afforestation plan of the project.					
3. Although mangrove afforestation was not included in the initial project plan in Bassoul, Dassilamé Serère, Kamatane Mbambar, Mbam, Moundé, Siwo, these figures are included in the above, as the figures explained in 2. above are included					

Factors which may have contributed to the above situation include; the villagers had acquired sufficient level of skills by the time of project termination, and some NGOs gave support to the villages for bearing the cost of afforestation, which produced complementary effect.

Sometimes mangrove afforestation was made even where or when the accumulation of the Environment Fund was not sufficient, as they had support from donors including local NGOs for receiving seeds and/or boat rentals for obtaining seeds from mangrove trees. Some villages planted mangroves without using the Environment Fund even though funds had accumulated, as they had support from NGOs. In the meantime, in

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based on the figure estimated at the development study was achieved.

<sup>15</sup>According to the interviews with the target villagers

considering the project's sustainability, establishment of the Environment Fund is very important because it is essential for awareness change of the villagers to conserve mangrove resources under their own initiatives at the village level, without depending on too much external support.

One of the reasons the ongoing management of income-generating activities as well as for the Environment Fund and afforestation is that the village organizations at the target villages which undertook project sponsored institution building have continued to play a major role in conducting all those activities. Although the level differs depending on each village, planning as an organization, monitoring, sharing the monitoring results at village meetings, recording and management of income-generating activities as well as afforestation activities and decision-making based on these records are conducted with the participation of villagers, with the initiatives of committees. These facts show that the organizational management capacity of the target villages are higher than most of the other villages in the area, (with few exceptions). The project activities for institution-building at all the target villages during implementation period led to the continuance of the organizational management at the village level. In addition, the follow-up dispatch of an ex-Japanese expert of the project after project termination for the sake of sustaining and further enhancing project effects, most likely was another promoting factor<sup>16</sup>. Dispatching an ex-expert who had already established trust with the villagers during implementation stage ensured consistency. Hence, institution-building was maintained and further promoted, especially because he effectively utilized Positive Approach management tools such as Action Learning, etc. Through the project, some new leaders have emerged, who are expected to play a major role together with the village organization to maintain and develop activities including the Environment Fund and afforestation. Also, if the Community Management Program (started in Fatick Region) functions, the maintenance and strengthening of organizations not only in the target villages but also in the whole area can be expected. On the other hand, however, transparent financial management, sharing monitoring results at village meetings and trust through consensus-making have not been established in some of the villages where the progress of income-generating activities, accumulation and disbursement of Environment Fund, etc. are falling behind.

#### (4) Perspective on Achieving Overall Goal

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<sup>16</sup>The ex-Japanese expert was dispatched twice between September 2008 and November 2008. The task included follow-up for another project, support for the basic principle of cooperation in the Environment Sector for Senegal and project formulation to support Forestry Department.

With regard to the diffusion to surrounding villages, it is hard to expect that the income-generating activities, Environment Fund and mangrove afforestation to be naturally extended. As for the diffusion to surrounding village mentioned in the Overall Goal, if Wula Nafaa Project and Community Management Program function well, it is expected to be diffused in the target areas of those project/program. Also, diffusion of the model including Environment Fund might be difficult to be diffused in wide area (as intensive external support to organizations for core village organizations is necessary), but there is a possibility for diffusion depending on the progress of the Community Management Program, as afforestation utilizing the Environment Fund with a participatory approach is included.

The aim of his project was supposed to be the establishment of a "PAGEMAS Model," i.e., a system in which the cost for the conservation of mangrove forest resources and afforestation is covered by the establishment and management of an Environment Fund. Part of the profits gained by income-generating activities are donated to the fund, which also contributes to conservation of mangrove forest as well, by institution-building of village organizations, improving skills needed for income-generating activities and systematic implementation of income-generating activities at the village level, as well as sustainable management of mangrove resources by the villagers own initiative.

Based on this understanding, Sustainability of the project is judged as ② for the following reasons. In the target area of the project, a) the effects observed at the time of final evaluation were still sustain, b) in terms of organizational management system, many of the village organizations have sufficient skills as well as high competency as an organization, although the extent differs depending on the village, c) from the aspects of policy and institution, no problems are observed in forestry sector, while some problems are seen in fishery sector, d) although the level of skill at the village level required for sustaining effects is high, there is a problem in expanding new markets which is a crucial factor for a sound financial basis in the future, leaving some concerns in regards to the possibility of conserving mangrove resources in the future.

For all the reasons above, the Sustainability of the project effects is medium. Although the sustainability of activities in the target villages is high, there are some policy and financial problems which hamper the diffusion of activities to surrounding villages.

## **4. Conclusion, Lessons Learned and Recommendations**

### **4.1 Conclusion**

The Relevance of the project is high, as it is consistent with the Senegalese development policy and development needs as well as Japanese aid policy. Also, the Efficiency is high as the elements of the Inputs are appropriate, and no problem can be seen in terms of duration and cost. On the other hand, as for the Effectiveness, the Project Purpose cannot be determined to have been achieved since the Project Purpose lacked clarity and measurability. Regarding the project's Impact, although the Overall Goal has not been achieved, a significant positive impact is observed in; the emergence of community spirit in each village, an improvement in organizational management skills at the village level, and a remarkable change in awareness in many target villages compared with the situation before the project implementation, (i.e., self-motivation and positivity, etc.). Hence, the Effectiveness and Impact from a comprehensive perspective is judged as medium. The Sustainability is also judged as medium, because; although the sustainability of effects in the target villages is high, the diffusability to surrounding villages is not sufficient from a political, institutional, organizational, and financial perspective. For the above reasons, the evaluation result of this project is high.

## **4.2 Recommendations**

### **4.2.1 Recommendations to Counterpart Organization**

The Forestry Departments at Dakar and at Foundiogne should regularly monitor the progress on the Community Management Program and the improvement in market access for the income-generating activities (apiculture, mangrove oyster culture, etc.). Also the Department should share the monitoring results with the above program committee and other donors, and make coordination among the stakeholders if necessary.

### **4.2.2 Recommendations to JICA**

The JICA Senegal Office should carefully watch the progress of the Community Management Program, share the monitoring results from; the Forestry Departments at Dakar and at Foundiogne; and information provided from time to time by the other donors such as USAID; and advise all concerned organizations such as the Forestry Department at Dakar, etc. as necessary.

## **4.3 Lessons Learned**

### **(1) Setting of project duration**

When you plan a project in which awareness change in terms of creating a new sense of solidarity as a community is vital for achieving the project objective, it is essential to have a sufficient survey on the social and cultural background, and to secure a sufficient project cooperation duration at the planning stage, as it takes more time until awareness

and behavioral change will take place compared with ordinary projects.

Reason: One of the major reasons why the Project Purpose was not achieved by the end of the project cooperation period is that it tried to accomplish too many objectives within the allotted 2 and 4 years. In addition to technology transfer for income-generation, other objectives included; the establishment of an Environment Fund, management by the whole village as one organization, accumulation of donations (part of the profit from the income-generating activities) and continuously planting mangrove and substitute trees. Achieving such objectives requires much time in an area where, prior to the project, people have had only a very small sense of unity as a community as they generally live separately in smaller groups within a village and have had only minimal experience to take joint action as a whole village. We have to keep in mind that it will lead to failure of achieving the Project Purpose and thus lower the Effectiveness at evaluation unless a careful analysis is done at the planning stage in regards to whether or not a change in awareness is necessary to bring about significant behavioral change for success of the project, and whether or not the project duration is sufficient for causing the change.

## (2) Setting of Project Purpose and Overall Goal

It is indispensable to set a clear and logical Project Purpose as well as specific and measurable Indicators to judge a project's Effectiveness. Checking the accessibility of data required for Indicators is necessary at the planning stage. If appropriate data is not available or too difficult to obtain at the time of planning, alternative Indicators must be considered or activities for collecting data should be added to the project's scope.

At the same time, in relation to a project's Impact, when including "diffusion" of a project's effect to other areas into a Project Purpose as an Overall Goal, we should avoid making easy hypothesis and conduct sufficient analysis to minimize Important Assumptions, or uncontrollable risk factors, and increase the probability of achieving the Overall Goal by adding necessary project components or linking the project to other projects which have complementary effect. If circumstances do not permit, the long-term effect should be set such that it can be achieved within the target area.

Reason: Another reason why the project cannot be judged as having achieved the Project Purpose by the end of project duration is that the Project Purpose had a problem in its clarity and logic, with inappropriate and inaccessible Indicators. Also, the reason that the Overall Goal had not been achieved at the time of ex-post evaluation is that there was an ungrounded supposition that the project effects would be diffused from villagers in target villages to villagers in surrounding villages once the project period was over; however, this would have required a degree of behavioral change in villagers which in turn would have required both institution-building and awareness change. In a project

like this, in order for the model established by the project to be diffused outside the target area, those areas outside the target area must undergo significant attitudinal and behavioral changes. Such changes require intensive support including external resources such as personnel with appropriate knowledge and skills in crucial areas such as institution-building. Neither the model nor the project effect can be diffused from villagers to villagers relying solely on their efforts. Therefore, sufficient analysis on the conditions necessary to be met not only from a technical perspective but also from a social, cultural and financial perspective must be undertaken and the results of such analysis must be reflected into a modified project design. If necessary, the project should be designed not as an independent project but as a part of a program, i.e., a group of projects with a common objective. People concerned should be fully aware that it is quite likely that the project will fail to achieve its Overall Goal, unless these actions are taken properly before project commencement. Also, it should be noted that achievement of Overall Goal is one of the most significant checkpoints of assessing Impacts at ex-post evaluation.

### (3) Securing collaboration with relevant ministry/agency

Since cooperation in the field of conservation and management of mangrove resources are concerned with a wide range of resources, it is indispensable not only to have official cooperation with the government body in charge of forestry but also with the ones in charge of fishery, so that orders or instructions are made consistently from the central government to the local level. Even if it does not appear to be significant at the planning stage, it can cause negative effects, having a a negative influence on administrative or policy aspects latter in the project such as the latter half of the implementation period or even after termination.

Reason: One of the negative factors concerning the Sustainability of the project involves some activities concerned with the fishery department involving life jacket production. Although villagers acquired the necessary skills to produce high quality products, life jackets sales are stagnant due to government subsidies to Chinese life jacket producers which have reduced the villagers' advantage in terms of market price. Also, Fishery Technical Officers' involvement throughout the implementation period and afterwards has rarely been observed. This lack of involvement is largely due to the fact that the central level of Fishery Department failed to instruct the local level Department and Fishery Technical Officers to cooperate and the local technical officers do not know that their organization is identified as the collaborative organization of this project. In a project concerning the improvement of a mangrove forest, it is necessary to have a commitment from the department or governmental organizations concerned with fisheries as an official



collaborative partner. Particularly in the field of mangrove forest conservation and management, the Forestry Department would find it very difficult to cover the whole scope of the project on its own and instruction for cooperation with the Fishery Department from the central level to local level prior to start of project cooperation should be obtained.