India

Forestry and Environment Project for Tamil Nadu State

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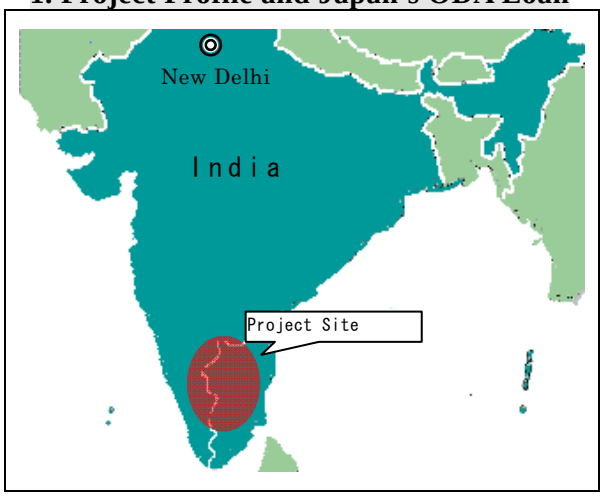
Field Survey: January 2008

1. Project Profile and Japan's ODA Loan



Location of the Project Site

Forestry Extension - Tree cultivation in private lands

1.1 Background

Tamil Nadu State located in the south-eastern region of India has an area of 130,058 km[21] with a population of approximately 62,405,679 people[2]. Its population density is 480 people/km[23], making it one of the most densely populated states. Its western region is mountainous due to the Western Ghats mountain range, whereas in the eastern region, plains stretch towards the Bay of Bengal. The climate in the western mountainous belt averages an annual temperature ranging from 20° to 24°C, while the plains area in the eastern region is semitropical and hot throughout the year with temperatures of around 30°C. The average annual rainfall is 925 mm. The rainy season is from October to December. It is affected by the north-eastern monsoons.

The ratio of forest area in Tamil Nadu State was about 17% in 1992, which was slightly under 23% of the entire country of India. In the said state, deforestation had continuously progressed due to increases in demand for wood as fuel both in urban districts and rural areas. As a result, valuable animal fauna had been lost. Approximately 89% of the forests are owned by the national government. However, deforestation had been going on continuously due to development deriving from a rising population and urbanization. At the time of appraisal 7000 sq. kms. of forest area in Tamil Nadu State was degraded. The reason for the

[1] Equivalent to 4% of the entire nation of India
[2] Equivalent to 6.0% of the entire nation (2006)
[3] The nationwide average is 329 people/km^2 (2006).

deforestation is that a large number of residents depend on forest products for their livelihoods.

At the same time, deforestation marks the local community lands mainly due to urbanization and the encroachment. Traditional management methods for community resources such as trees and fruit trees have not been sustained and local residents have been unable to garner adequate profits from community forests.

Based on the above, it was concluded that it would be necessary to formulate and implement a project aimed at preventing denudation of these forests, regenerating deforested areas, promoting biodiversity conservation, and raising the productivity of these forests.

1.2 Objective

The objective of this project was to implement a sustainable, community participatory afforestation project (tree planting, extension activities, etc.) in Tamil Nadu State, where deforestation had been continuously progressing, by preventing further degradation of forest lands, regenerating degraded forest lands, promoting biodiversity conservation, and improving forest productivity, thereby contributing to the region's environment and alleviating poverty.

1.3 Borrower/Executing Agency

President of India/Forest Department, State Government of Tamil Nadu

1.4 Outline of the ODA Loan

Loan amount/disbursed amount	13,324 million yen /13,286 million yen
Date of Exchange of Notes/Date of Loan Agreement	January 1997 /February 1997
Terms of Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 2.1% 30 years (10 years) General Untied
Final Disbursement Date	May 2005

2. Finding (Overall Rating: A)

2.1 Relevance (Rating: A)

2.1.1 Relevance at the Time of Appraisal

This project that aimed to prevent deforestation, regenerate forests, and promote environmental conservation was in alignment with the forestry sector plan of the National Forest Policy (formulated in 1988) and the Eighth Five-year Plan (1992 to 1997) whose goals were to recover and conserve ecological balance with the ultimate goal of covering one third of the country's land area with forest and woodland.

In particular, the development plan of the state specifically sets forth issues that have been regarded as important from past afforestation projects: promotion of land use that is in sync with the category of the forest, community participatory afforestation activities, assistance towards diversifying the income of residents dependent on the forest for their livelihoods, and researches and human resource development needed to carry out these activities. This project was designed to incorporate measures to address all of these issues.

It is said that Tamil Nadu State was once abundant forest land. However, pressure toward deforestation could not be arrested despite efforts by the state government to ban uncontrolled harvesting of trees, unrestrained logging to meet demand for lumber in urban areas, rising demand for firewood due to growing populations in rural areas, and excessive pressure to cut down forests due to overgrazing.[4] The loss and deterioration of the forests lowered the capacity to recharge water sources, brought on soil erosion, and reduced cultivated land area. Hence, it was an urgent issue to prevent deforestation and protect the forests.

In view of the above, it was judged that the relevance of this project was high in that there were pressing needs to supplement the demand for wood and to implement afforestation to reduce the pressure to cut down the forests.

2.1.2 Relevance at the Time of Ex-post Evaluation

The Tenth Five-year Plan (2002 ~ 2007) aimed at covering 25% of the national land area with forest by the last year of the plan in alignment with the abovementioned National Forest Policy. In addition, the plan emphasized the conservation of forest functions through soil and water conservation, forest management that takes into consideration the livelihoods of local residents, research and development, and extension activities. The approach adopted in this project was in alignment with the plan. The rate of forest and tree cover[5] in 2005 was 23.4%. The Eleventh Five-year Plan (April 2007 to March 2012) aims

[4] The area of government-registered forests in the state was 2,620,000 ha in 1956, but was reduced by about 15% or 2,240,000 ha in 1992. The forest ratio of the state dropped from 20% in 1956 to 17% in 1992, which was below the national average of 23%.

[5] Forest and tree cover rate indicates the percent area of forest cover (area of all lands, more than one hectare area, with a tree canopy density of more than 10 percent which is measurable from a satellite) is higher than 10% of the land in the targeted region) and tree cover (tree patches outside the recorded forest area exclusive of forest cover and less than the minimum mappable area of one

to increase the forest and tree cover by 5% at the end of the plan.

In the state's Ninth Five-year Plan (April 1997 to March 2002), the foremost priority was put on the revitalization of degraded forests. Based upon the goal, the state government carried out its policies and measures. In the following Tenth Five-year Plan (April 2002 to March 2007), in addition to the revitalization of degraded forests, focus was placed on sustainable forest management promoted by Joint Forest Management (JFM) and assistance to diversify the revenue of residents who were dependent on the forest. However, the open forest ratio[6] (46.0% in 2005) was high in comparison to the national average. Thus, a challenge was to enhance the volume and quality of the forest. The need for ecological conservation still remains high as does the need for forest conservation. Owing to this project, the infrastructure of the Forest Department was improved to some extent. However, it is essential to continue afforestation activities (especially activities under the JFM approach), human resource development, research and development, extension activities, and biodiversity conservation activities.

Implementation of the project was in alignment with the national plans both at the time of appraisal and at the time of the ex-post evaluation. The relevance of the project's implementation is extremely high.

2.2 Efficiency (Rating: A)

2.2.1 Output

In addition to afforestation, which is the major component of the project that accounts for 78% of the project costs, this project consists of several other components such as the capacity development of the Forest Department. Of the eleven activities planned, eight have exceeded their design ratio more than 100%. The reason is that an additional project has been implemented to plant trees on the JFM afforestation area (250 ha x 258 villages), to construct water usage facilities (50 ha/village x 258 villages), to improve extension facilities and equipment (15 sites), and other additional activities. Furthermore, the expanded activities to improve livelihoods helped the project to achieve its goals. In fact, at the start of the project, women's self-help groups (hereinafter referred to as SHGs) were created within the Village Forest Committee (hereinafter referred to as VFC)[7], which carried out various activities to improve livelihoods using microfinance, etc. This is due to the executing agency who concluded, based on JBIC's monitoring and interim review during the project's implementation, that in order to achieve adequate impact, the amount of microfinance had to be increased so as to expand the activities to improve livelihoods.

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hectare which is not measurable from a satellite).

[6] Open forest refers to forests with a tree canopy density between 10% and 40%: Open forest ratio = open forest area/forest area

[7] Anyone may participate in the VFC, but one man and one woman from one family must participate. The VFC elects representatives from its members for the Executive Committee (EC) that represents and operates the VFC. The EC consists of 5~15 representatives, excluding the President. The VFC has several hundred members.

For components other than afforestation, the facilities of the Forest Department were improved almost as planned, and monitoring using the geographical information system (GIS) began in some sections of the area. The training and extension activities provided to Forest Department staff members, VFC members, students, and others who have many opportunities to get in touch with local community members achieved a performance that surpassed the project design.

The project at the time of appraisal and its performance are shown in Table 1 below.

Table-1 Project Output

Plan (at the time of appraisal)	Actual Performance (at the time of ex-post evaluation)
(1) Planting Activities Total area of afforestation activities: 406,000 ha, Number of trees planted: 147 million trees	(1) Planting Activities Total area of afforestation activities: 457,454 ha (113% of planned output) Number of trees planted: 163 million trees (project ratio: 111%)
a) JFM land owned by government*: 250,000 ha +1,000 villages	a) JFM land owned by government*: 314,471 ha + 1,258 (rural communities)
b) Tribal life support *: 2,000 ha	b) Tribal life support *: 2,025 ha.
c) Community plantation development *: 50,000 ha	c) Community plantation development *: 25,690 ha (*planned values after changes in scope: 23,000 ha)
d) Establishing a seedling nursery and distributing saplings: 25 million trees	d) Establishing a seedling nursery and distributing saplings: As planned
e) Water augmentation *: 100,000 ha	e) Water augmentation*: 112,360 ha
f) Sand dune stabilisation: 500 ha	f) Sand dune stabilisation : As planned
g) Afforestation to protect against blown sand and storms: 500 km	g) Afforestation to protect against blown sand and storms : 488 km.
h) Timber growing stock improvement: 730 ha	h) Timber growing stock improvement: 730 ha
i) Teak canal bank plantations: 1,000 km	i) Teak canal bank plantations: 1,000 km
j) Wetlands (mangrove) conservation: 1,226 ha	j) Wetlands (mangrove) conservation: As planned
k) Dry evergreen forests conservation*: 1,000 ha (Note: *Planting activities community participation)	k) Dry evergreen forests conservation*: 495 ha (Note: *Planting activities community participation)
Number of VFCs established: 1505	Number of VFCs established: 1,258 (84% of planned output) Number of SHGs established: 3,891
(2) Developing a GIS database, etc.	(2) As planned (introducing of a GIS database, starting of local observations[8])
(3) Extension activities (establishing an extension centre, providing motor vehicles, video equipment, etc.)	(3) As planned (Extension in special techniques in afforestation is being carried out in the eastern district where bedrock predominates in 15 major local facilities.)
(4) NGO cooperation: Cooperation of 38 NGOs will be solicited.	(4) In conjunction with an increase in afforestation areas, the cooperation of 205 NGOs obtained.
(5) Implementing training	(5) From the lessons learned from the Swedish

[8] It has become possible to monitor the changes over the years in tree canopy density and other factors in a section of the area under management.

Plan (at the time of appraisal)	Actual Performance (at the time of ex-post evaluation)
Domestic training: • In-service training for rangers: 7 courses (20 people each) • In-service training for Assistant Conservators of Forest (ACF) and Deputy Conservators of Forest,(DCF): 9 courses (80 people each) • PRA training for rural community surveys with VFC participation: 2 courses (total of 800 people, 1000 villages) Overseas training: • GIS training: 3 times • Master's course:2 times • Short term: 4 times (6) Office, motor vehicle for monitoring, office equipment, etc.	International Development Cooperation Agency (SIDA) run by afforestation project, focus was placed on training activities for staff members of the Forest Department. (6) As planned, although the following items were added. • JFM afforestation area (250 ha x 258 communities) • Constructing water usage facilities (50 ha/village x 258 villages) • Improving extension facilities and equipment (15 sites), and others

Afforestation Areas Before and After

Mangrove Forest (targeted project area)

2.2.2 Project Period

The project was originally designed to be implemented for 62 months from February 1997 to March 2002. The physical activities contemplated were fully achieved (100%) by the end of 5th year. However, due to fluctuation of exchange rates, only 70% of the loan amount (9343.63 million yen) was drawn. As the loan agreement was valid till 29th May, 2005 it was decided to utilize the balance loan amount (30%) and carry out certain additional activities within the project period. Additional activities were undertaken with the concurrence of JBIC. Therefore, instead of 1000 villages, 1258 villages were covered (126%) and as against the original physical target of 406,000 ha., an achievement of 457,454 ha. was made (113%) with the loan amount. Additional activities were fully completed by the year 2003-04 and operation and maintenance works alone were carried out in May 2005 utilizing the JBIC funds. Hence there was no time over run in the project.

2.2.3 Project Costs

The project cost for the original five year period was 15,675 mil. JPY and the loan amount was 13,324 mil. JPY. At the end of the loan agreement period i.e. as on 29.05.2005, only 13,286.43 mil. JPY was spent after carrying out additional activities for two more years. This was out of the total loan amount of 13,324 mil. JPY. The planned project cost for five years was 15,675 mil. JPY. However, the actual project cost was 17,329 mil. JPY. The 11% increase is due to management of redeployed staff for three more years. This increased cost was met by the State Government in local currency (INR).

2.2.4 Overall Efficiency

The project was implemented for 62 months and the full scope of the physical activities were completed. However, in view of 30% of loan amount still available as per loan agreement, the additional activities were carried out for 2 more years with the concurrence of JBIC to cover additional villages and allied activities. The operation and maintenance works were carried out for further one year. Hence the continuation of the project activities is not related to time over run. The overall efficiency was very much in evidence as not only original scope of works but additional works were carried out within the time limit and well within the loan amount and the loan agreement period. At the end of the project period (2005), there was a savings of 38 million yen in Yen loan.

Overall efficiency is rated from the view whether the planed output except for the additional works has been implemented on the basis of the project period and cost estimation at the appraisal. The project period was 62 months as planed, to be rated as “a”, and the project cost was within the estimated amount provided that exceeding 11% was used for the additional works, to be rated as “a.” Therefore, the overall project efficiency was excellent.

2.3 Effectiveness (Rating: A)

2.3.1 Actual Afforestation Area, and Preservation of the Forest Lands and Regeneration of the Degradation of Forest Lands

Although it takes a few years before planted saplings form a forest,[10] the rate of forest cover in the state rose from 13.1% (17,045 km^2) in 1995 to 17.7% (23,044 km^2) in 2005 (there was an increase about 5,999 km^2 (4.6 points) during this decade). It is believed that the project has indeed played a role in achieving the increase. The afforestation area of this project (4,800 km^2) is about twice the area of Tokyo and is equivalent to 21% of the forest area registered in the state. The area of dense forest[11] in the targeted region is on the increase. VFCs were formed to jointly manage the forests together with community residents. As a result, it is surmised that the pressure to cut down the remaining natural trees has been alleviated. In the arid region, due to soil and water conservation activities, the soil's moisture retention capacity was improved and soil erosion was prevented, creating an environment suited to the growth and development of trees. Thus, this project has clearly regenerated deforested areas.

Table 2 Rate of Forest Cover and Forest and Tree Cover in Tamil Nadu State

Year	State Forest Area by Rate of Tree Crown (km^2)			Forest Cover Rate (%)	Forest and Tree Cover Rate (%)
	Dense Forest (40% and above)	Open Forest (Between 10 and 40%)	Total		
1987	10,866	7,491	17,472	13.43	-
1989	9,759	7,909	16,992	13.06	-
1991	9,757	7,909	16,992	13.06	-
1993	9,422	8,283	17,005	13.07	-
1995	9,418	8,327	17,045	13.11	-
1997	8,676	8,367	17,064	13.12	-
1999	8,659	8,398	17,078	13.13	-
2001[12]	12,009	8,983	20,992	16.14	20.80
2003	12,438	10,565	23,003	17.69	21.52
2005	12,440	10,604	23,044	17.72	22.04

Source: Forest Department/Forest Survey of India

[10] Although it differs according to tree species, it generally takes five to ten years. (FAO data on afforestation; http://www.fao.org/forestry/11833/en/)

[11] Forest where the canopy density is 40% and above; according to the Ministry of Environment and Forests of India

[12] Measurement methods changed in 1999 and 2001, and the survey map was reduced in scale from 1/250,000 to 1/50,000 and its accuracy was improved.

2.3.2 Biodiversity Conservation

Ecological regeneration through afforestation and soil conservation activities[13] and protecting the remaining natural trees has led to ecological conservation, wildlife protection, and biodiversity conservation. In conjunction with this project, due to the state government's efforts to promote wildlife conservation activities such as registration of national parks, the return of wild birds and other wildlife has been confirmed by local residents in the project-targeted area. Thus, the objective of the project has been achieved, since afforestation and water/soil conservation activities have been adequately carried out as had been planned for the protection of biodiversity.

2.3.3 Recovery of Productivity in Deforested Areas

The Forest Department reports that the productivity of the project area has improved by nearly 70% from the time of appraisal owing to this project. The production volume of forest products in the state is given in Table 3. According to the Forest Department, the production volumes of firewood, timber and other minor forest products (MFPs) such as bamboo, fodder, fruit, and other special forest products have increased since the time of appraisal. Since tree species could be selected to meet local residents' needs, the production of forest products increased, thereby improving the livelihoods of community residents and alleviating the pressure to fell other remaining natural trees. The process from afforestation to the harvest of forest products takes time, and continued monitoring is required. Yet, as of now, it can be concluded that the objective of raising the productivity of the targeted forest area has been achieved.

Table 3 Annual Production Volumes of Forest Products

Forest Product	Annual Production Volume (ton)		Annual Production Volume (1000 rupees)	
	Plan at the Time of Appraisal	FY2004/2005 Performance	Plan at the Time of Appraisal	FY2004/2005 Performance
Firewood	10,200	17,057	10,800	18,157
Timber	4,200	7,421	48,660	85,977
Other MFPs	-	1,023	-	2,200

Source: State Statistics (data from the State Statistical Report, 2007)

[13] Activities include civil engineering works like constructing check dams to recharge water sources.

Afforestation

Environmental Education Activities

2.3.4 Afforestation Component Internal Rate of Return

Regarding the internal afforestation component of this project at the time of appraisal, the project benefit was defined as the sales amount of forest products for the twenty-five-year period after afforestation. When the economic internal rate of return (EIRR) was computed using afforestation costs and the subsequent maintenance and operations costs, the result obtained was 16.0%. When it was recomputed in this evaluation using the same conditions, the result obtained was 12.7%. The reason for the lower value is that the actual local currency conversion of the project cost exceeded that in the plan. This value indicates that this project's input was an optimal allocation of resources from a national economic standpoint, and the project's economic profitability was not lost.

2.3.5 Effect of Components Other Than Afforestation

In addition to afforestation, the extension and training facilities constructed under this project were adequately used and had an important effect on strengthening the capacity of Forest Department staff members and educating VFC members.[14] Focus was especially placed on training for the Forest Department staff members working in the field.

The expanded facilities and the audio-visual equipment were generally used often and greatly contributed to the efficient implementation of the project by the Forest Department. The monitoring system of the afforestation area is being strengthened by incorporating satellite data in GIS, and in some areas, it has reached the stage of being put to practical use.[15] The monitoring was once done manually before the project was implemented. Now that it is uniformly managed by the headquarters of the Forest Department, it has become possible to grasp the existing conditions immediately. Thus,

[14] It had an important effect in assisting community participatory afforestation activities such as environmental education, communal sharing of forest products, etc.

[15] Although it is only a segment of the project area, changes in the forest and tree cover rate over the years are being monitored. At the same time, measures to address the issue of deviations from actual measurements are under review.

other components that support the major task of afforestation have also shown their effects.

Based on the above, it can be stated that the project has produced its overall effects as had been planned and that the effectiveness of the project was high.

2.4 Impact

2.4.1 Impact on Poverty Reduction

With respect to the number of workers and working days employed in afforestation activities, etc. with the implementation of this project, approximately 61 million people were employed during the entire project period. Nearly 40% of the employed workers were women. The funds that were provided for the VFC joint account with the aim of improving livelihoods under this project attracted support activities in other sectors such as farming and regional development, thereby helping facilitate the building of social infrastructure, etc. based on the community's long-term forest conservation plan. The number of new business practitioners stemming from living improvement activities[16] is shown in Table 4. The total number of new business practitioners, 175,930 people, was equivalent to 38% of the total number of VFC members, or 465,588 people. The number of people in self-help groups (SHGs) that mainly consist of women was 62,495, which was equivalent to 13% of the VFC membership. In addition, an estimated 100,000 people, or 60% of the community residents whose livelihoods depended on forest products, acquired other sources of income. As a result, community residents dependent on the forest for their livelihoods were reduced by a ratio of several tens of percent, thus contributing to poverty reduction.

According to an interview survey of the community members living near the major project areas, women and children no longer had to travel for many hours to collect fodder (grass and leaves) and firewood from the forests. Since that labour was channelled into other productive activities, many households increased their income through farming and raising livestock. It was confirmed that the family budget's dependence on the forest dropped. Other opinions were that household income increased, diets improved due to expanded farming, housing improved due to increased production of construction materials (bamboo), income rose, the school attendance rate improved since children were freed from collecting firewood and fodder, and other favourable changes were seen in some segments of the communities. In particular, it is surmised that the Scheduled Tribes, who were highly dependent on the forest, and the poor were greatly improved for the better.

Although this project alone cannot eliminate poverty in the region, a limited impact was confirmed. In rural communities where joint forest management and community land management have been carried out, social harmony has increased through improved awareness about forest management, expanded community participation, joint activities, and organized distribution of forest products. The Forest Department conducted a sample survey

[16] They indicate activities aimed at diversifying income through new programs such as renting kitchen equipment using microfinance.

in 2005 and reported that the income of users of microfinance was about 3,000 rupees to 10,000 rupees per month and that the income of the targeted tribes had risen by an annual average of about 10%.

Table 4 Number of New Business Practitioners with Income-increasing Activities (Cumulative/People)

Type of Work	Men	Women	Total
Incense	257	1,771	2,028
Bamboo baskets	544	1,599	2,143
Coconut cords	445	574	1,019
Dairying	20,625	24,459	45,084
Bee-keeping	426	249	675
Poultry	1,568	1,090	2,658
Animal husbandry	4,186	3,726	7,912
Woven palm	1,055	2,071	3,126
Tailoring	1,082	5,611	6,693
Utensil and furniture hiring	161	179	340
Others	55,338	48,914	104,252
Total	85,687	90,243	175,930

Source: Forest Department data

The number of beneficiaries of this project is equivalent to the number of members of the Village Forest Committees (of the local communities) who have carried out afforestation activities. It is estimated that a maximum of about 470,000 people benefited from this project, which was about 0.8% of the total population of the state.

2.4.2 Impact of Environmental Conservation

The findings of interviews of community residents at the time of the field survey indicate the following positive impacts related to environmental conservation through afforestation.

The existence of natural trees with medium to high density in afforested areas in the designated forest region, natural regeneration of woods, regeneration of germination, the growth of grass, etc. were confirmed. The project yielded a good outcome in environmental conservation through the following important effects brought about by soil and water conservation works. They are the increased moisture in the soil, reduced soil erosion and runoff, a rise in the groundwater level (an average of 1 m~1.5 m) that contributed to an increased rice crop (according to interviews with local residents, two to three times more than before the project was implemented), increased availability of drinking water in the project villages, reduced pressure on the forests from illegal grazing, illegal felling of trees and mountain fires, and the contribution to the plantings of mangroves at wetlands, dry

evergreen forests, sand dunes, shelter belt, afforestation for lumber production, and afforestation along waterways. During the project period, 21,743 checkdams and 1,869 percolation ponds were constructed with a combined capacity 664.32 mil.cu.ft.

The selection criteria for tree species that were planted were based on JFM guidelines.[17] That is, priority was given to native tree species that are suited to the soil conditions of the afforestation area and have high survival rates. In afforestation activities for the restoration of biodiversity and native tree species, of the entire tree species planted in the project area, the ratio of native tree species was 100%.

Community members have reported seeing the return of a segment of valuable bird species in areas afforested under the project.

2.4.3 Other Impacts (Gender, etc.)

In conjunction with a rise in household income, many families have begun to use propane gas instead of firewood, and women and children have been freed from the work of collecting firewood and taking livestock out to graze. Through SHG activities, women have also learned the skill of negotiating, and the opportunity to speak at gatherings has increased.

A women farmer engaged in vermi-compost production

Through the use of microfinance, a beneficiary who began compost production

Women participating in a gathering

2.5 Sustainability (Rating: A)

2.5.1 Executing Agency

2.5.1.1 Organization

Basic infrastructure has been improved due to this project. As a result, the Forest Department has a highly efficient framework for implementing the project. The Forest

[17] The guidelines explain the method of JFM and were formulated by the Ministry of Environment and Forests of India in 1993.

Department had 4,381 technical staff members at the time of ex-post evaluation and 4,997 non-technical employees. In addition, a Project Co-ordination Cell was created in the headquarters of Forest Department to plan, monitor, and coordinate the entire project.

2.5.1.2 Technical Capacity

In the past, the Forest Department achieved comparatively good results (use and management of resources for residents) in the afforestation project implemented under the assistance of the Swedish International Development Cooperation Agency (SIDA). The department effectively applied its experiences and techniques learned from the past project to this project. In addition, after completion of the project, training courses of a duration extending from three days to one month concerning afforestation techniques and joint forest management have been continuously held for the staff of the Forest Department (as a part of JBIC phase 2 ODA loan project), VFC members, and NGOs in order to promote the smooth implementation of the project and maintain its sustainability after the end of the project. The Forest Department has been making efforts to improve the practical abilities of the forest officers, especially those who work in the field, so that they learn the knowledge required for facilitating sustainable forest management with community participation.

The JFM approach is one of the important elements of the training activities, and, in fact, the training method is based on a manual. The range of monitoring with the use of GIS has been expanded to include, for instance, forest and tree cover rate, and a monitoring system has been firmly established. It will take a period of five to ten years to apply the outcome of afforestation trials carried out by research institutes to the project. Hence, the project is basing its tree species selection on past trial results. This practice is indeed important in constantly raising the quality of afforestation.

Based on the above, it can be judged that technical problems with regard to operation and maintenance are not anticipated.

2.5.1.3 Financial Status

The Forest Department's annual budget for the project did not change during the project's implementation and after completion of the project. It remained around 900 million rupees. Training and extension activities have continued at the same pace as during the project's implementation. Thus, the state government's efforts to continue the activities can be seen. The ratio of the Forest Department's budget to the state's overall budget has been on a downward trend since the time of appraisal when it was 0.9%. However, the actual budget amount has increased. It is expected that the budget will continue to be appropriately allocated, which reflects the intentions of the Forest Department.

In addition, the agreement between the Forest Department and the VFC stipulates

the benefit distribution of forest products[18] and the maintenance and use[19] of the village development fund[20] (to be spared for operation and maintenance costs such as reafforestation expenses). It further provides that the maintenance cost of the project forest area will be paid from this fund.

Based on the above, it can be concluded that the financial system for operation and maintenance has been well established, thereby securing the sustained effects of this project.

Table 5 Annual Budgets of the State and Forest Department

(Unit: Million Rs.)

Year	1999	2001	2003	2005	2007
Total Budget Amount of the State	207,208	215,570	252,710	280,771	591,391
Forest Department Budget	1,980.3	2,080.1	1,966.5	2,415.0	3,063.2
(The lower tier is the ratio (%).)	1.0%	1.0%	0.8%	0.8%	0.5%
Project Budget	961.4	1,160.4	895.6	822.4	1,069.7
(The lower tier is the ratio (%).)	49%	56%	46%	34%	35%

Source: Response sheet of the Forest Department questionnaire

2.5.2 Operation and maintenance

The ways in which the operation and maintenance method was applied during the project period were adequate and appropriate. For instance, approximately 52 million rupees were allocated to cover the annual costs of operation and maintenance. After completion of the project as well, operation and maintenance have been carried out satisfactorily. In addition, the facilities and equipment that were provided under this project continue to be frequently used and are appropriately maintained overall.

The organizational structure of the Forest Department responsible for controlling the operation and maintenance of this project is headed by the Chief Conservator of Forests, assisted by Conservators of Forests and District Forest Officer under whom the Range Forest Officers assumes field-level responsibilities.

Forest Officers including the Range Forest Officers participate in the VFC meetings as a Member-Secretary. The meetings are held frequently and Executive Committee meetings are also held once a month. Before the project was implemented, there were many cases of illegal cutting of trees and goat grazing, but the VFC is now able to take self-regulatory measures within the committee.

This project placed emphasis on addressing the issues of diversifying the revenue of VFC and its livelihood improvement activities utilizing a system of microfinance. As a

[18] VFC receives all the benefits derived from forest products for special use. On the other hand, benefits from lumber are distributed to the Forest Department at 10% and to the rural development fund managed by the VFC at 90%.

[19] In this fund, based on the current government's order, the Forest Management Association opens a bank account for the fund, which is put under the control of the chairman and secretary-general of the Forest Management Association (normally, forest officers of the Forest Department).

[20] Based on the performance of the SIDA project, the agreement signed between the Forest Department and the Forest Management Association stipulates an appropriate amount to be reserved in the fund.

result, a certain degree of effect is showing, and there is no concern about sustainability over the short and medium term. It is necessary to continuously monitor and confirm the self-reliance of livelihood improvement activities. However, the evaluation is that overall, there is no problem with the project's sustainability.

3. Conclusion, Lessons Learned, and Recommendations

3.1 Conclusion

In light of the above, this project is evaluated to be highly satisfactory.

3.2 Lessons Learned

In this project, the JFM system raised the awareness of local residents to participate in the project. When similar projects are formulated in the future, it will be beneficial to incorporate a mechanism to invite local residents to take an active part from the stage of project implementation, for instance, in profit sharing of forest products. However, during the initial stage, the yield amount is inadequate and therefore, funds for livelihood improvement activities will be insufficient. In this project, direct financial assistance was provided until stable revenue was generated, thereby spurring on support for other sectors. A result was that the impact on improving livelihoods appeared as had been planned.

The major objectives of the project can be evaluated as having been fully achieved, but the issue of project design that includes a data-monitoring system for each objective still remains.

3.3 Recommendations for the Forest Department of Tamil Nadu State

There are no recommendations.

Comparison of original and actual scope

Item	Plan (at the time of appraisal)	Actual (at the time of ex-post evaluation)
(1) Output	(1) Planting Activities Total area of planting activities: 406,000 ha, Number of trees planted: 147 million trees a) JFM land owned by government*: 250,000 ha +1,000 villages b) Tribal life support *: 2,000 ha c) Community plantation development *:50,000 ha d) Establishing a seedling nursery and distributing saplings: 25 million trees e) Water augmentation *: 100,000 ha f) Sand dune stabilisation: 500 ha g) Afforestation to protect against blown sand and storms: 500 km h) Timber growing stock improvement: 730 ha i) Teak canal bank plantations: 1,000 km j) Wetlands (mangrove) conservation: 1,226 ha k) Dry evergreen forests conservation*: 1,000 ha (Note: *Planting activities with community participation) Number of VFCs established: 1505 (2) Developing a GIS database, etc. (3) Extension activities (establishing an extension center, providing motor vehicles, video equipment, etc.) (4) NGO cooperation: Cooperation of 38 NGOs will be solicited. (5) Implementing training Domestic training & Overseas training: (6) Office, motor vehicle for monitoring, office equipment, etc.	(1) Planting Activities Total area of planting activities: 457,454 ha (113% of planned output) Number of trees planted: 163 million trees (project ratio: 111%) a) JFM land owned by government*: 314,471 ha + 1,258 (rural communities) b) Tribal life support *: 2025 ha. c) Community plantation development *: 25,690 ha (*planned values after changes in scope: 23,000 ha) d) Establishing a seedling nursery and distributing saplings: As planned e) Water augmentation*: 112,360 ha f) Afforestation of sand dunes: As planned g) Sand dune stabilisation: 488 ha. h) Timber growing stock improvement: 730 ha i) Teak canal bank plantations: 1,000 km j) Wetlands (mangrove) conservation: As planned k) Dry evergreen forests conservation*: 495 km (Note: * Planting activities with community participation)) Number of VFCs established: 1,258 (84% of planned output) Number of SHGs established: 3,891 (2) As planned (introducing of a GIS database, starting of local observations[9]) (3) As planned (Extension in special techniques in afforestation is being carried out in the eastern district where bedrock predominates in 15 major local facilities.) (4) In conjunction with an increase in afforestation areas, the cooperationof 205 NGOs obtained. (5) From the lessons learned from the Swedish International Development Cooperation Agency (SIDA) run by afforestation project, focus was placed on training activities for staff members of the Forest Department. (6) As planned, although the following items were added. • JFM planting area (250 ha x 258 communities) • Constructing water usage facilities (50 ha/village x 258 villages) • Improving extension facilities and equipment (15 sites), and others
(2) Period	December 1997 to March 2002 (62 months)	February 1997 to May 2005 (101 months)
(3) Project Cost Foreign Currency Local Currency Total ODA Loan Portion Exchange Rate	 779 million yen 14,896 million yen (4,744 million rupees) 15,675 million yen 13,324 million yen 1 rupee＝3.14 yen (As of May 1996)	 770 million yen 16,559 million yen (7,107 million rupees) 17,329 million yen 13,286 million yen 1 rupee＝2.33yen (Average from January 1997 to May 2005)

[9] It has become possible to monitor the changes over the years in tree canopy density and other factors in a section of the area under management.