

India

FY2019 Ex-Post Evaluation of Japanese ODA Loan

“Tripura Forest Environmental Improvement and Poverty Alleviation Project”

External Evaluator: Sawa Hasegawa, OPMAC Corporation

0. Summary

The objective of this project was to rehabilitate the forests in Tripura, a state in northeastern India, and to raise the income of the local residents by extending assistance to participatory afforestation and to those engaged in slash-and-burn shifting cultivation (hereinafter referred to as “shifting cultivation”), as well as to preserve the biodiversity of the region, thereby contributing to regional environmental improvement and poverty alleviation.

The project was highly relevant to the development plan and development needs of India at the times of appraisal and ex-post evaluation, as well as to Japan’s ODA policy at the time of appraisal, so its relevance is high. While the project cost was within the plan, the project period exceeded the plan. Outputs were produced almost as planned and the efficiency was fair. Through afforestation, community development and livelihood improvement activities, support for the shift of livelihoods to shifting cultivators, biodiversity conservation activities, etc. were conducted through the project. It was confirmed that there were effects such as forest restoration, water and soil conservation and biodiversity improvement in the target area as well as creation of employment, diversification of the means of livelihood and increase in the income of local residents. In addition, it was confirmed that improvements in forest restoration, water and soil conservation, and biodiversity had contributed to the improvement of the natural environment of the region and that the increase in the income of the local residents had contributed to improvement in the social and economic capacities of women as well as to poverty reduction in the region. Therefore, the effectiveness and impact of the project are high. After the completion of the project, the operation and maintenance system was taken over by the implementation system of the ongoing “Project for Sustainable Catchment Forest Management in Tripura” which is a successor to the project. The Project Management Unit (PMU) established in the project continues to exist and the management system of the PMU is in place. No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, the sustainability of the project effects is high.

In light of the above, the project is evaluated as highly satisfactory.

1. Project Description



Project site



Tree-planting site in the project target area

1.1 Background

Tripura is one of the seven states in northeastern India and borders Bangladesh on three sides: north, west and south. It is a mountainous and hilly state with rich forest resources, more than 70% of its area of 10,491 km² being covered with forests.

In Tripura, about 80% of the state's population were living in rural areas, and in particular, the majority of scheduled tribes (indigenous people), which account for about 30% of the state's population, relied heavily on forests. The poverty rate among the residents in the mountainous and hilly areas of the state was as high as about 40%. Excessive extraction of forest resources by these poor people and shifting cultivation have severely devastated forests, and between 1999 and 2003, the canopy rate in about 430 km² of dense forest decreased by an average of about 20%. As a result, soil runoff and the deterioration of water retention capacity have also been serious problems. Under these circumstances, the state sought to promote participatory and sustainable forest management and biodiversity conservation as part of its forestry sector reforms and anti-poverty measures.

1.2 Project Outline

The objective of the project was to rehabilitate the forests in Tripura and raise the income of local residents by extending assistance to participatory afforestation and to those engaged in shifting cultivation, as well as to preserve the biodiversity of the region, thereby contributing to regional environmental improvement and poverty alleviation.

<ODA Loan Project>

Loan Approved Amount / Disbursed Amount	7,725 million yen / 5,458 million yen
Exchange of Notes Date / Loan Agreement Signing Date	March 2007 / March 2007
Terms and Conditions	Interest Rate 0.75% Repayment Period 40 years (Grace Period) (10 years) Conditions for Procurement General Untied
Borrower / Executing Agency	The President of India / Tripura Forest Department (TFD), Government of Tripura
Project Completion	March 2017
Target Area	1) Gomati District (Amarpur, Karbook, Udaipur) 2) Khowai District (Teliamura, Khowai) 3) Part of North Tripura District (Dharmanagar, Panisagar, Kanchanpur) 4) Sepahijala District (Sonamura, Bishalgarh) 5) South Tripura District (Belonia, Sabroom) 6) Unakoti District (Kailashahar, Kumarghat) 7) West Tripura District (Sadar, Mandai) 7 Districts (16 Sub-divisions) in total
Main Contractor(s) (Over 1 billion yen)	None
Main Consultant(s) (Over 100 million yen)	NR Management Consultants India Pvt. Ltd. / Nippon Koei Co., Ltd.
Related Studies (Feasibility Studies, etc.)	“Special Assistance for Project Formation (SAPROF) for Tripura Forest Environmental Improvement and Poverty Alleviation Project (TFIPAP)”
Related Projects	[ODA Loan project] “Project for Sustainable Catchment Forest Management in Tripura (SCATFORM)” (October 2018)

2. Outline of the Evaluation Study

2.1 External Evaluator

Sawa Hasegawa, OPMAC Corporation

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September, 2019 – February, 2021

Duration of the Field Study: January 13, 2020 – January 30, 2020

3. Results of the Evaluation (Overall Rating: A¹)

3.1 Relevance (Rating: ③²)

3.1.1 Consistency with the Development Plan of India

India's national development plan at the time of appraisal, the *Tenth Five Year Plan* (2002-2007), set the target of achieving forest cover of 25%, with an emphasis on the rehabilitation of degraded forests, sustainable forest management through the promotion of Joint Forest Management (JFM), and support for forest dependents to obtain alternative income sources.

The national development plan at the time of the ex-post evaluation, the *INDIA Three Year Action Agenda*³ (2017/18-2019/20⁴), placed environmental and forest protection as a priority item for sustainability. In particular, the following were indicated as policies for forest protection: 1) Development of forest management and database using the Global Positioning System (GPS) and various types of software to measure the effects of the various afforestation programs implemented so far, and the capacity strengthening of those using such software; 2) Formulation of a unified policy to control the invasion of invasive alien species that cause damage to crops and ecosystems; and 3) Especially in the northeastern part of India, change of the subsidy policy for oil palm cultivation, which is a single cultivation, in order to prevent deforestation and the loss of species, from the perspective of biodiversity protection.

As mentioned above, forest protection and ecosystem/biodiversity conservation were important issues in India's development policies at the times of appraisal and ex-post evaluation. Furthermore, the forest protection policy of the Government of India at the time of ex-post evaluation emphasized the development of GPS forest management and database, the strengthening of regulations from the viewpoint of ecosystem protection, and the decrease of monoculture from the viewpoint of biodiversity protection. This was consistent with the GPS forest management and biodiversity protection activities implemented by this project. Thus, the project is considered to be consistent with the development policy of the Indian government.

3.1.2 Consistency with the Development Needs of India

India was once covered by abundant forests, with about 40% of its land area covered by forests at the beginning of the 20th century, but in 2003, the forest cover rate⁵ was 23.7%, lower than the world average of 29.6%. Many people, including the poor, depend on forests for livestock feed, fuel, income, etc., and the burden on forests has increased due to population growth. As a

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ③: High, ②: Fair, ①: Low

³ The formulation of the conventional five-year plan for national development by the Government of India was completed with the *Twelfth Five Year Plan* (2012-2017). The three-year action agenda has been developed from 2017.

⁴ In the Indian fiscal year, 2017/18 is from April 2017 to March 2018. The same applies to the following fiscal years.

⁵ The share of forests (land with an area of 1 ha or more that can be measured by satellite and with a canopy rate (percentage of tree leaf cover on a given plot of land surface) of 10% or more) and trees (land less than 1 ha in size that cannot be measured by satellite and with a canopy rate of 10% or more) in the target area. The canopy rate less than 10% is called scrub and 10% or more is called forest.

result, the deterioration of forests and the decline in the function of forests to conserve water and soil have become more serious. The decline in the groundwater level has led to shortages of agricultural and drinking water. The lives of the poor, who are mainly dependent on agriculture, have been put under pressure. In order to secure income, forests have been deforested while dependence on forests has been increasing, which has created a vicious circle. In addition, since the rate of open forest⁶ in India was as high as 42.4% in 2003 and its function as a forest was generally low, the improvement of forest quality (decrease in the rate of open forest) has been an important issue together with the expansion of forest area.

On the other hand, in terms of the state of the forest environment at the time of the ex-post evaluation, according to the *India State of Forest Report* prepared every two years by the Forest Survey of India under the Ministry of Environment, Forest and Climate Change, the forest cover rate of India was 21.7% in 2017, slightly worse than the 23.7% in 2003. In addition, the open forest rate in 2017 was 42.8%, almost the same as the 42.4% in 2003. Therefore, the expansion of forest area and improvement of forest quality continue to be important issues in India.

Forest degradation was progressing in Tripura as a result of the expansion of traditional shifting cultivation due to population growth, as well as an increasing load on forests due to the increased demand for livestock feed, fuel, etc. collected from forests. In 1989 and 2003, the forest area of Tripura State decreased by 508 km² of dense forest, but increased by 337 km² of open forest, indicating further forest degradation.

Table 1 shows the forest cover rate and the dense and open forest rates in Tripura in 2007 when the project started and in 2017 when the project was completed. Compared with 2007, the forest degradation had significantly improved in 2017 due to an increase in the dense forest rate and a decrease in the open forest rate, but the overall forest cover rate had decreased, and the decrease in forest area remained an issue.

Table 1: Forest Cover Rate and Forest Canopy Rate in Tripura in 2007 and 2017

Forest cover rate	2007	2017	Forest canopy rate	2007	2017
Forest	77.0%	73.7%	Dense forest rate	60.5%	76.2%
Scrub	0.7%	0.3%	Open forest rate	39.5%	23.8%
Non-forest	22.3%	26.0%	Total	100.0%	100.0%
Total	100.0%	100.0%			

Source: *India State of Forest Report 2009* (Data measured in 2007), *India State of Forest Report 2019* (Data measured in 2017)

According to TFD, the main causes of the decrease in forest cover rate in the state are: 1) Implementation of shifting cultivation (called “Jhum”); 2) Implementation of deforestation and cultivation by owners of land where the forest rights are recognized under the *Scheduled Tribes*

⁶ A canopy rate of less than 40% of the forest is called open forest and of 40% or more is called dense forest. The open forest rate is the percentage of open forest in the forest.

and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (hereinafter referred to as “RoFR”) formulated in 2006 (the land given to the forest rights holders with a maximum of 4 ha per person, hereinafter referred to as “Patta Land”); 3) Indiscriminate and unscientific harvesting of forest resources; 4) Expansion of road and rail networks due to development, and 5) Expansion of urban areas due to population increase, etc.

Tripura is the first state in India to apply the RoFR, and the area of Patta Land covers 18% of the total area of the state. Although the owners of Patta Land are responsible for maintaining the sustainable use of their land, biodiversity conservation and ecosystem balance, this is not the case in practice and there is much degraded Patta Land in the state. Since data on the number of cases and areas of shifting cultivation implemented in the state has not been compiled, increase or decrease in the implementation of shifting cultivation is not clear. However, although TFD is able to regulate deforestation and shifting cultivation on state lands, the implementation of shifting cultivation remains a challenge in Tripura because it is difficult for TFD to enforce the regulations in Patta Land owned by RoFR holders. In addition, Dhalai District, which is outside the target area of the project, has the largest area of Patta Land in the state, and it is estimated that shifting cultivation is implemented more there than in other districts. This is considered to be one of the causes of the decrease in forest cover of the entire state. The area and number of owners of Patta Land by district are shown below.

Table 2: Area and Number of Owners of Patta Land by District in the 8 Districts in Tripura

District	Area of Patta Land (ha)	Rate of area (%)	Number of owners of Patta Land (households)
Gomati	31,294.02	17	25,152
Khowai	26,380.16	14	16,247
North Tripura	30,610.14	16	15,402
Sepahijala	8,586.73	5	8,027
South Tripura	22,553.70	12	20,289
Unakoti	9,582.99	5	6,428
West Tripura	8,053.86	4	5,150
Dhalai (outside the target area)	49,167.42	26	34,208
Total	186,229.02	100	130,903

Source: Questionnaire response by TFD

In terms of the poverty situation at the time of appraisal, as shown in Table 3, the poverty rate in Tripura was 34.4%, which was higher than the overall 26.1% in India. On the other hand, the poverty rate of Tripura in 2013 was 14.1%, which had greatly improved compared to the time of appraisal.

Table 3: Population and Poverty Rate in Tripura and India

	2006			2011	2013
	Population (million people)	Poverty rate	Rate of scheduled tribes	Population (million people)	Poverty rate
Tripura	3.2	34.4%	31.1%	3.7	14.1%
India	1,020	26.1%	8.2%	1,210	21.9%

Source: Documents provided by JICA (Data as of 2006), *Census 2011* (Data as of 2011), *Annual Report 2013*, Reserve Bank of India (Data as of 2013)

As seen above, the poverty rate in Tripura has improved. However, according to interviews with TFD and the residents in the project target area, the residents in mountainous and hilly areas, especially those who live on sloping land that is unsuitable for farming, and the residents in the wildlife sanctuary, are largely unable to cultivate and still live mainly dependent on forest resources. The opportunities for cash income are still limited and thus, there remains the need for poverty reduction.

3.1.3 Consistency with Japan's ODA Policy

Japan's *Country Assistance Program for India* (formulated in May 2006) at the time of appraisal placed "Improvement of poverty and environmental problems through health and sanitation issues, local development, water supply and sewerage support, afforestation support, etc." as one of its three priority areas. In addition, "Efforts based on disaster prevention support" as measures for poverty issues and "Support for the forest sector" as measures for environmental issues were specifically placed in the priority area. Also, JICA's *Overseas Economic Cooperation Operation Implementation Policy* (2005) placed "Support for poverty reduction" and "Support for global environmental issues and peace-building" as overall priority areas, and "Regional development that benefits the poor" and "Response to environmental issues" as priority areas for India.

This project has been highly relevant to India's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs⁷

The project implemented a variety of activities consisting of five components, including participatory afforestation through JFM, support for shifting cultivators, biodiversity conservation activities, and so on. The main outputs of the project were as follows.

⁷ For details, see "Comparison of the Original and Actual Scope of the Project" on the last page of the report.

In the project target area, 463 Joint Forest Management Committees (JFMC) were newly established.⁸ In addition, about 3 to 4 Self Help Groups (SHG) were established per JFMC, for a total of 1,549 SHGs. Each SHG has around 10 members. JFMCs and SHGs established by the project were all registered under the *Societies Registration Act* enacted in 1860.

Of the established JFMCs, those established in the wildlife sanctuary area are called the Eco Development Committees (EDC) and have the same function as a JFMC. However, EDC members cultivate land outside the protected area, as residents within the protected area are prohibited from cultivation as well as deforestation activities within the area. In addition, the new Regrouped Villages (RGV) were established at a place in the state with relatively good road access for households engaged in shifting cultivation in the forested hinterland of the project target area. One JFMC was established for each RGV.

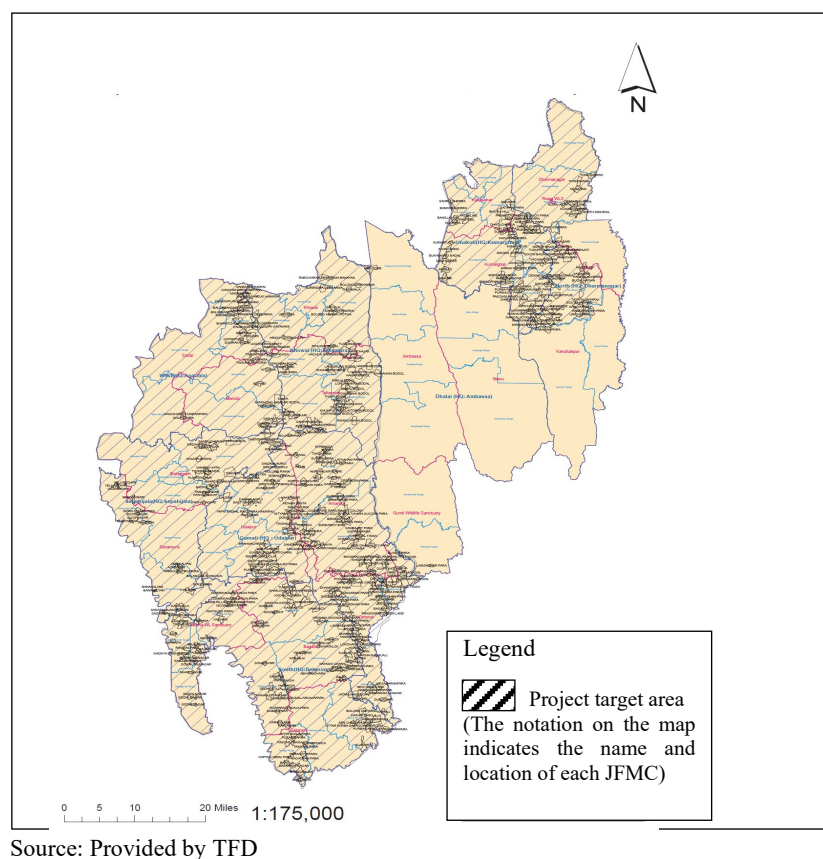


Figure 1: Project Target Area in Tripura State

Table 4 shows the number of JFMCs/EDCs/RGVs and SHGs established, member households, and the breakdown by ethnic origin of the member households for each district. 94% of the member households are from scheduled tribes (ST), and the majority of forest dwellers are from ST.

⁸ This includes 30 JFMCs established as EDCs and 16 JFMCs established in RGVs described below.

Table 4: Number of JFMCs/EDCs/RGVs and SHGs established by the Project and Member Households including the Breakdown of Ethnic Origin by District

District	Number of JFMCs	Number of EDCs	Number of RGVs	Number of JFMCs/EDCs/RGVs	Number of SHGs	Number of member households	ST	SC	RM	OBC	UR
Gomati	131	14	5	150	499	10,911	10,546	55	237	44	29
Khowai	49	0	7	56	198	5,204	5,164	17	0	15	8
North Tripura	38	1	2	41	127	2,365	2,216	10	20	81	38
Sepahijala	33	0	0	33	105	3,359	2,882	154	269	49	5
South Tripura	70	15	2	87	315	6,918	6,296	183	54	143	242
Unakoti	66	0	0	66	206	4,303	3,818	132	8	323	22
West Tripura	30	0	0	30	99	2,534	2,492	11	0	3	28
Total	417	30	16	463	1,549	35,594	33,414	562	588	658	372

Source: Documents provided by TFD

Note: ST: Scheduled Tribe, SC: Scheduled Caste, RM: Religious Minorities, OBC: Other Backward Classes, UR: Unreserved Category

(1) Forest Rehabilitation and Development

Afforestation consists of the three types of Artificial Regeneration (AR), Aided Natural Regeneration (ANR) and Conversion of Monoculture.⁹ The area of afforestation of each type depended on each JFMC in accordance with the intentions of its members when they prepared the micro plan.¹⁰ The planned and actual values of planted area by type, and the species of plants, number of plants planted, planted area and planting costs by type are as follows.

Table 5: Planned and Actual Planted Area by Type

Type	Planned area (ha)	Actual area (ha)
AR	15,500	15,667
ANR	35,280	37,377
Conversion of Monoculture	220	176
Total	51,000	53,220

Source: Documents provided by TFD

⁹ AR is the planting of tree seedlings or seeds after a timber harvest to facilitate artificial tree growth. ANR is a method for enhancing the establishment of secondary forests in degraded grasslands by pruning sprouts, removing high stumps and vines and conducting complementary planting. Conversion of Monoculture is a conversion from single tree species to mixed planting.

¹⁰ Action plans for forest management and regional development, etc., created with the participation of members.

Table 6: Species of Plants, Number of Plants Planted, Planted Area and Planting Costs by Type

Type	Species of plants		Number of plants planted	Planted area (ha)	Planting costs (rupees/ha)
AR	Mixed	Arjun, Bahera, Haritaki, Yangchak, Kathal, Amla, Tetul	7,562,066	6,806.54	24,394
	Bamboo	Muli, Kanak kaich, Bari, Barak, Mritinga, Rupai, Dolu, Kata bans, Makal, Lathi bans	5,537,875	8,860.60	7,381
	Sub-total		13,099,941	15,667.14	14,772
ANR	Mixed	Arjun, Bahera, Haritaki, Yangchak, Kathal, Amla, Tetul, Gandhaki, Broom grass, Bara, Elachi, etc.	26,465,898	23,821.69	6,315
	Bamboo	Muli, Bari, Barak, Mritinga, Rupai, Makal, Lathi Bans	2,710,988	13,554.94	6,477
	Sub-total		29,176,886	37,376.63	6,374
Conversion of Monoculture	Mixed	Bamboo and brush such as Bahera, Amla, Haritaki, etc.	110,000	176	16,371
	Sub-total		110,000	176	16,371
Total			42,386,827	53,219.77	

Source: Questionnaire response by TFD

While it was planned that farm forestry¹¹ for 897 ha would be implemented in addition to afforestation, this was changed to introduce agroforestry in order to regenerate the degraded Patta Land that spreads throughout the state and to plant food and cash crops for the effective use of forest resources. The implementation of agroforestry was scaled up to 8,297 ha by using approximately 170 million rupees of funds under the *Mahatma Gandhi National Rural Employment Guarantee Act* (MGNREGA). Table 7 shows the results according to the species of main and inter crops, planted area and the planting costs of agroforestry by model type.

Table 7: Species, Planted Area and Planting Cost of Agroforestry by Model Type

Model Type	Species of main crops	Species of inter crops	Planted area (ha)	Planting costs (rupees/ha)
Model 1	Bamboo, Jackfruit	Maize, Pineapple	192.23	49,000
Model 2	Gamar, Lemon	Pigeon pea, Ginger	530.83	52,000
Model 3	Areca nut, Bamboo	Sesame, Maize, Black pepper	1,378.49	50,000
Model 4	Acacia, Litchi, Lemon	Maize, Turmeric	760.95	49,000
Model 5	Teak, Jackfruit	Maize, Ginger	424.51	51,000
Model 6	Mango, Bamboo	Maize, Pineapple	3,654.84	51,000
Model 7	Agar, Areca nut	Turmeric, Black pepper	234.11	53,000
Model 8	Banana, Acacia	Turmeric	1,209.81	52,000
Model 9	Orange, Acacia	Papaya, Turmeric	68.92	52,000
Total Planting Area			8,454.69	

Source: Questionnaire response by TFD

¹¹ Afforestation on private land that is not suitable for agriculture.

In addition, as enrichment plantations for non-timber resources, 1,140 ha of broom grass, gandhaki, cardamom, black pepper, etc. were planted.



Bamboo planted by JFMC



Broom grass (material for brooms)

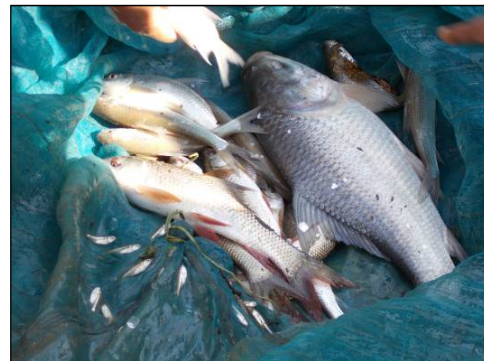
(2) JFM Community Development

The regional development and livelihood improvement activities included the construction of 399 Vocational Training Centers (VTC), 58 Multi-Utility Centers (MUC), 6 Common Community Facility Centers (CCFC), and 53 Mini-CCFCs (smaller than CCFC, but with no difference in use) as small-scale infrastructure development. These facilities are used for conducting various types of vocational training and general training, such as management training for JFMC/EDC/RGV members and training for Income Generation Activities (IGA) by SHGs. They are also used as offices for holding the meetings of each group and storing account books and documents.

In addition, a total of 2,513 check dams were constructed in the project target area, creating a total of 1,452.03 ha of water sources. Freshwater fish farming became possible at these water sources, and have been carried out as one of the IGAs by SHGs. In addition to the project funds, approximately 27.5 million rupees from MGNREGA was used for the construction of the check dams.



Check dam constructed



Cultured fishes in check dam

The project provided activity funds to each JFMC/EDC/RGV, broadly divided into two categories: one being funds for the implementation of the micro plan prepared and the other subleases from JFMCs to SHGs for IGAs (hereinafter referred to as “revolving funds”). Each JFMC, EDC, and RGV received a rolling 150,000 rupees, for a total of 69.45 million rupees from the project, of which 67.02 million rupees were used as small loans for IGAs by SHGs (The unused portion remains in JFMC’s account). Of the 1,549 SHGs established, 1,313 received loans from JFMCs. The number of IGAs undertaken and loans borrowed, and the total amount of loans, as well as the estimated rate of return and income per capita on some of IGAs are as shown in Tables 8 and 9. Of the SHGs that received loans, 494 had repaid JFMC by the time the business was completed and received a second loan, 88 received a third loan, and 11 had received a fourth loan by the project completion.¹²

Table 8: Number of IGAs Conducted, Loans Borrowed and Total Amount of Loans

	IGAs	Number of SHGs conducted	Number of loans provided from JFMCs	Total amount of loans (rupees)
1	Pig farming	1,166	1,262	45,881,888
2	Aquaculture (Freshwater fish)	736	550	17,211,945
3	Nursery plantation	96	8	270,000
4	Incense stick making	80	4	148,500
5	Poultry farming	49	29	810,125
6	Broom making	48	14	522,000
7	Mushroom growing	32	1	15,500
8	Cultivation	31	4	115,000
9	Non-Timber Forest Products (NTFP)	26	7	106,000
10	Goat farming	25	10	290,500
11	Dairy	24	14	725,000
12	Bamboo sale	13	0	0
13	Beekeeping	11	2	47,000
14	Handloom	10	2	80,000
15	Handicraft	5	0	0
16	Candle making	4	1	30,000
17	Band party	3	3	80,000
18	Vermicomposting	1	0	0
19	Tailoring	1	0	0
20	Others	34	14	690,000
	Total	2,395	1,925	67,023,458

Source: Documents provided by TFD

¹² JFMCs offered SHGs loans at interest rates ranging from 2% to 6% per annum. Other terms and conditions are as follows.

- 1) SHGs have to be formed with members within JFMCs.
- 2) SHGs must have a valid bank account with regular savings by its members.
- 3) SHG members have to get basic training on IGAs.
- 4) SHGs need to have a standardized business plan.
- 5) SHGs need to repay earlier loans for higher loans.
- 6) The repayment period of loans varies as per the business plans of IGAs.

Table 9: Estimated Rate of Return and Income per Capita per Month on the Main IGAs

IGAs	Rate of return/ Income per capita per month
Pig farming	160%
Aquaculture (Freshwater fish)	170%
Nursery plantation	40%
Mushroom growing	320%
Incense stick making	4,0005,000 rupees/person/month
Handloom	5,0006,000 rupees/person/month
Terracotta	3,5004,000 rupees/person/month
Bamboo handicrafts	3,000 rupees/ person/month
Broom making	4,5005,000 rupees/person/month
Broom grass harvesting	3,0004,000 rupees/person/month
NTFP	1,500 rupees/person/month

Source: Documents provided by TFD

In addition to the funds from JFMCs through the project, small loans to SHGs were financed by about 2.31 billion rupees from the Government of Tripura.

(3) Rehabilitation for RGVs of Shifting Cultivators

16 RGVs were established and shifting cultivators settled there. One JFMC was established for each RGV, and 65 SHGs were established in total. In the target area of RGVs, afforestation and agroforestry were carried out in 4,012 ha, and 46 out of the 65 SHGs borrowed from JFMC for their IGAs, including for aquaculture, pig farming, poultry farming, the production of brooms and incense sticks, etc. In addition, 14 VTCs, 2 MUCs, 15 barns, 2,043 kitchens, 47 wells, 30 health camps, 2 schools, and 133 check dams were constructed as infrastructure development.

(4) Biodiversity Conservation

30 EDCs and 97 SHGs were established and 135 check dams were constructed for a total area of 4,408.63 ha in the Sepahijara, Trishna and Rowa Wildlife Sanctuaries in the state. In the same way as for JFMCs, activities such as afforestation, water and soil conservation, and IGAs by SHGs were conducted for EDCs.

It was planned that the development of ecotourism would be carried out in the three Wildlife Sanctuaries above, but this was changed to only the Trishna Wildlife Sanctuary as it was found that targeting the three sanctuaries would significantly exceed the budget. Five ecotourism developments were conducted in the Sanctuary, including the



The Butterfly Park located in the Trishna Wildlife Sanctuary

Butterfly Park, the Bison Safari, the Chilapathar Eden of Bison, the Dwarikamurasing Para Bio-

Conservation Park and Panchakarma Therapy and Research. Biodiversity surveys (research and inventory) were also conducted, identifying 34 biodiversity-rich areas and 106 species of butterflies in the Trishna Wildlife Sanctuary.



Panels exhibited in the Butterfly Park



Enclosed butterflies raised in the Butterfly Park

(5) Supporting Activities

As the project implementation system, a Project Management Unit (PMU) was established at the central level, independent of TFD. The PMU was registered as an autonomous society with its own operating rules, including financial, accounting, personnel, management norms, etc., and it was planned that it would function as an organization dedicated to the implementation of the project. In addition, the Non-Timber Forest Products (NTFP) Centre of Excellence (NCE) was established at the central level, the Divisional Management Units at the forest division and wildlife sanctuary level, and the Range Management Units (RMU) at the forest range level.

Meanwhile, the administrative boundary of Tripura State was changed from four districts to eight districts in January 2012 during project implementation, and the forest administrative boundary was changed in October 2014 accordingly. After the change was carried out, instead of the Divisional Management Units, State, District, Sub-division, Wildlife Sanctuary, Range and Beat, District Management Units (DMU) and Sub-divisional Management Units (SDMU) were established for forest administration in Tripura. Districts and Sub-divisions correspond to the administrative boundary of Tripura, but other areas are separated from the boundary.

Furthermore, 35 Community Organizers (6 of which are female) and 23 Livelihood Coordinators (4 of which are female) were assigned as field workers at the range level, and one Field Facilitator was placed in each JFMC/EDC/RGV. These field workers served as liaison and instructors for the JFMCs/EDCs/RGVs in charge and provided vocational training and management training for their members. In order to provide more training for the members of JFMCs/EDCs/RGVs, the field workers were trained through TOT (Training of Trainers), and the number of training participants was changed from 46,300 at the time of the plan to 90,147. The final number of participants in the training was as follows.

Table 10: Planned and Actual Number of Participants of Training conducted by the Project

Training participants	Planned number of participants	Actual number of participants
TFD	-	4,340
JFMCs/EDCs/RGVs members	-	15,072
SHG members	-	57,970
Others	-	22,091
Total	90,147	99,473

Source: Questionnaire response by TFD

NCE has the functions of research and production, value added creation and marketing, and production training and extension for bamboo and NTFP, etc. As part of the marketing activities for bamboo and NTFP, the timing of the harvesting of bamboo and broom grass, etc. was set, together with the prices of various types of bamboo and the harvest cost of bamboo and broom grass. A profit sharing system between JFMCs and their members was established. In addition, approximately 800 craftsmen were trained through the handicraft training conducted through this project, and a store called “Crafts & More” was opened in NCE for the purpose of selling the handicrafts produced by these craftsmen.



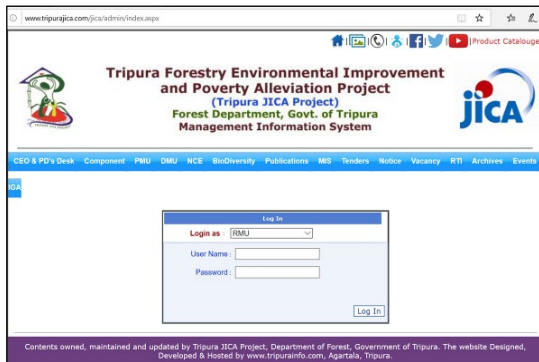
Crafts & More (A shop in the center of town)



Handicrafts sold in Crafts & More

A Geographic Information System (GIS) laboratory was established in the PMU office, a GIS database and web-enabled Management Information System (MIS) were developed, and technical guidance for GIS software operation was provided. Furthermore, a project website “Tripura JICA Project”¹³ was established and updated periodically during project implementation. In addition, various pamphlets and booklets were prepared as publicity materials for the project, and street plays and participatory workshops were held for participation in the JFMC activities and to raise the awareness of the target residents regarding forest protection and biodiversity conservation.

¹³ <http://tripurajica.com/>



Access site to the database on the website of Tripura JICA Project



GIS laboratory in the PMU office
(The maps on the wall are made using GIS data)

In addition, two kinds of impact surveys were conducted by external organizations to monitor and evaluate the project.¹⁴

From the above, it can be seen that some of the outputs were changed from the plan, but also that all of these changes were made with consultation and agreement between JICA and PMU, and that the project outputs were produced as planned after the changes.

3.2.2 Project Inputs

3.2.2.1 Project Cost

While the original project cost was 9,216 million yen (of which the amount covered by ODA Loan was 7,725 million yen), the actual cost was 5,771 million yen (of which the amount covered by yen loan was 5,458 million yen), which was within the plan (63% of the planned amount). The amounts of the foreign and local currency breakdowns, price escalation, physical contingency, and interest during construction are unknown. Furthermore, some activities such as agroforestry and IGAs by SHGs were implemented using funds from other schemes and it was difficult to accurately calculate the Indian share of this project; therefore the amount covered by the loan for each item is also unknown (the actual amount covered by the ODA Loan above is the total disbursed amount). Therefore, evaluation will be made based only on the cost borne by the Japanese side.

¹⁴ *Social Impact Assessment of Income Generating Activities Initiative of TFIPAP: A Pilot Study*, Department of Sociology, Tripura University, December 2013, *Third Party Assessment of Assets created under Tripura JICA Project*, Mott MacDonald, July 2014.

Table 11: Original and Actual Project Cost

Unit: Million yen (Original cost and Actual cost equivalent to yen)

Items	Original cost						Actual cost	
	Foreign currency portion		Local currency portion		Total		Million rupees	Yen equivalent Note
	Total	JICA	Total	JICA	Total	JICA		
Forest Rehabilitation and Development	0	0	2,520	2,520	2,520	2,520	1,006.45	1,913
JFM Community Development	0	0	2,064	2,064	2,064	2,064	1,059.12	2,013
Rehabilitation for RGVs of Shifting Cultivators	0	0	730	730	730	730	280.78	534
Biodiversity Conservation	0	0	167	167	167	167	66.37	126
Supporting Activities	101	101	702	702	803	803	366.42	697
Price Escalation	6	6	379	379	385	385	0	0
Physical Contingency	5	5	329	329	334	334	0	0
Consulting Services	195	195	239	239	434	434	62.41	119
Administration	0	0	892	0	892	0	194.23	369
Tax and Duties	22	0	577	0	599	0		
Interest during Construction	288	288	0	0	288	288	0	0
Total	617	595	8,599	7,130	9,216	7,725	3,035.78	5,771

Source: Documents provided by JICA (Original cost), Questionnaire response by TFD (Actual cost)

Note: The original cost is converted at 1 rupee = 2.52 yen (As of September 2006) and the actual cost is converted using the average exchange rate (1 rupee = 1.90 yen) from 2007 to 2017 by International Financial Statistics, IMF

While most of the project cost was denominated in local currency, the average annual exchange rate in 2007 at the start of the project was 1 rupee = 2.85 yen, while the average annual exchange rate in 2017 at the completion of the project was 1 rupee = 1.72 yen, the exchange rate of the rupee against the yen having fallen by 60% over 10 years. As a result, while the output was produced almost as planned, the actual project cost in yen amounted to 63% of the original amount. For reference, the actual amount of the project cost in rupees was 83% of the original amount.

3.2.2.2 Project Period

While the original project period was from March 2007 to March 2015 (97 months), the actual period was from March 2007 to March 2017 (121 months), which exceeded the plan (125% of the planned period). In the first few years after the project started, budget disbursement did not take place in a timely manner, and the assignment of the personnel of PMU was delayed due to the public recruitment of personnel to establish PMU as an autonomous society. The numbers of personnel was not allocated as planned, which resulted in the project activities not proceeding as planned for the first couple of years. However, most of the activities were completed by the original scheduled period of March 2015.

However, as RoFR formulated in 2006 came into effect in 2008, more than 25% of forest land ownership was transferred from TFD to local residents, resulting in a shortage of afforested target areas and the need to take measures against this. As a result of the adjustment,

although agroforestry activity was introduced in collaboration with MGNREGA, the change was approved in January 2012 and related activities started in 2012. More than 50% of the budget for this activity was from MGNREGA's budget and it was necessary to change the schedule for the Forest Rehabilitation and Development component according to the situation of the budget expenditure of MGNREGA. In addition, for some JFMCs and SHGs established in the latter half of the project period, an additional project period was needed to strengthen their capacity to ensure organizational sustainability. As a result, the project period was extended by two years from the original plan.

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

Table 12 shows the Financial Internal Rate of Return (FIRR) and the Economic Internal Rate of Return (EIRR) calculated at the time of appraisal and the ex-post evaluation of the project. Neither of the internal rates of return at the time of the ex-post evaluation are necessarily accurate because most of the benefit-cost data is not available and calculations were made using the forecast data at the time of appraisal. The large increases in both internal rates of return at the time of the ex-post evaluation can be attributed to the outputs increased by utilizing the funds from other schemes, while the project cost (amount borne by the Japanese side) was lower than planned.

Table 12: Internal Rates of Return of the Project

IRR	At the time of appraisal	At the time of ex-post evaluation	Cost	Benefit	Project life
FIRR	16.8%	20.0%	Project cost (excluding price escalation and interest during construction), Administration cost	Increase in forest products, IGAs	50 years
EIRR	18.7%	24.9%	Project cost (excluding price escalation and interest during construction), Administration cost	Increase in forest products, IGAs, Soil erosion prevention	50 years

Source: Documents provided by JICA (At the time of appraisal), Calculated by external evaluator (At the time of ex-post evaluation)

Although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

3.3 Effectiveness and Impact¹⁵ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

In this project, ten indicators were set as Operational and Effect Indicators. No baseline values were set for each indicator. The achievement of each indicator is judged based on whether or

¹⁵ Sub-rating for Effectiveness is to be put with consideration of Impacts.

not the actual value after two years from the completion of the project (2019) has reached the target value. However, the successor project, SCATFORM, is being implemented in the same target area as this project, and the data for 2019 includes the actual value of SCATFORM. In addition, the actual value of each indicator limited to this project after project completion was not collected by TFD. Therefore, in this ex-post evaluation, the achievement is judged based on the actual value as of the completion of the project (2017). The results of each indicator are as follows.

Table 13: Operation and Effect Indicators (Afforestation area, Quantity of planting)

	Indicator	Baseline	Target	Actual	
		2007	2017	2017	2019
			2 Years After Completion	Completion Year	2 Years After Completion
1	Afforestation area	-	59,297 ha	61,675 ha	NA
2	Quantity of planting	-	110,200,000	119,248,402	NA

Source: Documents provided by JICA (Target value), Questionnaire response by TFD (Actual value)

The target value of “Afforestation area” at the time of appraisal was 55,100 ha (51,000 ha planted by JFMCs + 4,100 ha planted by RGVs), but this was changed as the area of agroforestry plantations increased (51,000 ha + 8,927 ha for agroforestry). As seen above, both indicators achieved their target values.

Table 14: Operation and Effect Indicators (Survival rate)

	Indicator	Baseline	Target	Actual	
		2007	2017	2017	2019
			2 Years After Completion	Completion Year	2 Years After Completion
3	Survival rate	-	1 st year after planting: 90% 3 rd year after planting: 70% 5 th year after planting: 50%	1 st year after planting: 90% 2 nd year after planting: 80% 3 rd year after planting: 70%	NA

Source: Documents provided by JICA (Target value), Questionnaire response by TFD (Actual value)

Accurate data for this indicator was not collected and the actual value above is the one estimated by TFD.

Table 15: Operation and Effect Indicators
(Number of JFMCs established, Number of SHGs established)

	Indicator	Baseline	Target	Actual	
		2007	2017	2017	2019
			2 Years After Completion	Completion Year	2 Years After Completion
4	Number of JFMCs established (including EDCs and RGVs)	-	410 (456)	417 (463)	NA
5	Number of SHGs established	-	1,400	1,549	NA

Source: Documents provided by JICA (Target value), Questionnaire response by TFD (Actual value)

The target value of the “Number of JFMCs established” at the time of appraisal was 400, but the number of JFMCs was changed from 400 to 410 as the number of establishing EDCs was changed from 40 to 30. As seen above, both indicators achieved their target values.

Table 16: Operation and Effect Indicators (Rate of forest cover)

	Indicator	Baseline	Target	Actual	
		2007	2017	2017	2019
			2 Years After Completion	Completion Year	2 Years After Completion
6	Rate of forest cover	-	Scrub ^{Note 1} >> Open forest ^{Note 2} Open forest >> Dense forest ^{Note 3}	Decrease in the area of scrub and open forest, Increase in the area of dense forest	NA

Source: Documents provided by JICA (Target value), Questionnaire response by TFD (Actual value)

Note 1: Canopy rate 010%, Note 2: Canopy rate 1040%, Note 3: Canopy rate more than 40%

The target value of this indicator was not set at the time of appraisal from the point of view of how much the increase would be from scrub to open forest and from open forest to dense forest. Therefore, the target value is not clear. When the intention of the target value was confirmed with TFD at the time of the ex-post evaluation, it was recognized as being “decrease in the area of scrub and open forest as well as increase in the area of dense forest.” As the basis for the actual value of this indicator, according to the *India State of Forest Report*, the area of scrub, open forest and dense forest in the project target areas (7 out of the 8 districts, excluding Dhalai District) of Tripura in 2007 and 2017 is shown in Table 17. The area of scrub and open forest is decreasing, and the area of middle dense forest and very dense forest is increasing. Therefore, this indicator is judged to have achieved the target value.

Table 17: Forest Area by Forest Canopy Rate in the Project Target Area in 2007 and 2017

Forest canopy rate	Area in 2007 (km ²)	Area in 2017 (km ²)	Difference (km ²)
Scrub ^{Note 1}	64	27	-37
Open Forest ^{Note 2}	2,521	1,434	-1,087
Middle Dense Forest ^{Note 3}	3,441	3,770	+329
Very Dense Forest ^{Note 4}	108	538	+430

Source: *India State of Forest Report 2009* (Data measured in 2007), *India State of Forest Report 2019* (Data measured in 2017)

Note 1: Canopy rate 010%, Note 2: Canopy rate 1040%,

Note 3: Canopy rate 4070%, Note 4: Canopy rate more than 70%

Table 18: Operation and Effect Indicators

(Production of forest products, Increase in income per beneficiary household)

	Indicator	Baseline	Target	Actual	
		2007	2017	2017	2019
			2 Years After Completion	Completion Year	2 Years After Completion
7	Production of forest products	-	627,000,000 rupees/year	NA	NA
8	Increase in income per beneficiary household	-	10%	10%	NA

Source: Documents provided by JICA (Target value)

The data for “Production of forest products” was not collected and not available. The actual value of “Increase in income per beneficiary household” was 61% according to the TFD questionnaire responses as the result of the impact survey conducted by an external organization. However, the details of the survey methods, such as the number of samples and the sampling method of the impact survey, could not be confirmed, so taking into account the result of another impact survey of this project, which was conducted in the preparatory survey for the successor project, SCATFORM,¹⁶ the actual value has been judged to be 10%. This indicator achieved the target value.

Table 19: Operation and Effect Indicators (Job creation, Training lecture attendees)

	Indicator	Baseline	Target	Actual	
		2007	2017	2017	2019
			2 Years After Completion	Completion Year	2 Years After Completion
9	Job creation	-	38,900,000 person days	38,920,000 person days	NA
10	Training lecture attendees	-	90,147 persons	99,473 persons	NA

Source: Documents provided by JICA (Target value), Questionnaire response by TFD (Actual value)

¹⁶ *Preparatory Study on Project for Sustainable Forest and Catchment Management in Tripura State: Final Report*, JICA, Kokusai Kogyo Co., Ltd., Ides Inc., and IC Net Ltd., August 2018

The target value of “Training lecture attendees” at the time of appraisal was 46,300, but this was changed to 90,147 as the number of trainees increased. As seen above, both indicators achieved their target values.

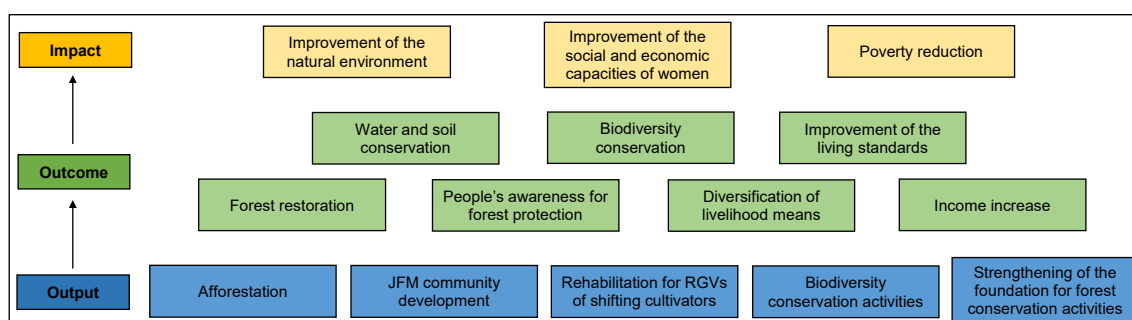
As mentioned above, it was difficult to judge the achievement level of two of the ten indicators set as Operation and Effect Indicators, as accurate data could not be obtained for “Survival rate” and the data was not available for “Production of forest products”. However, the remaining eight indicators achieved their target values.

3.3.1.2 Qualitative Effects (Other Effects)

The following were assumed as the qualitative effects of this project.

- Improvement of the natural environment (Forest restoration, Water and soil conservation, Biodiversity conservation)
- Improvement of the living standards of residents (Diversification of livelihood means and Improvement of living conditions)
- Improvement of the social and economic capacities of women

Based on the path from output to outcome and impact of the project, these qualitative effects can be categorized as shown in Figure 2; The outcome-level effects are 1) Forest restoration, 2) People’s awareness of forest protection, 3) Water and soil conservation, 4) Biodiversity conservation, and 5) Improvement of the living standards of residents (Diversification of livelihood means and Income increase). The impact-level effects are 1) Improvement of the natural environment, 2) Improvement of the social and economic capacities of women, and 3) Poverty reduction. Therefore, the status of the qualitative effects related to effectiveness and impact was confirmed by the above classification in this ex-post evaluation.



Source: Made by external evaluator

Figure 2: Composition of Output, Outcome and Impact of the Project

A questionnaire survey with TFD as well as interview surveys for 2 to 4 groups of JFMCs, EDCs, and RGVs selected from the 7 target districts were conducted in order to confirm the

qualitative effects. A total of 17 groups were selected, and the members of each group and the SHG members who belong to each group were interviewed.¹⁷ The breakdown of JFMCs, EDCs and RGVs visited in each district and sub-division is shown in Table 20.

Table 20: Number of JFMCs, EDCs and RGVs Interviewed at the Ex-post Evaluation

District	Sub-division	Number of JFMCs/EDCs/RGVs Interviewed
Gomati	Udaipur	2 JFMCs
	Karbok	1 RGV
Khowai	Teliamura	1 JFMC, 1 RGV
North Tripura	Dharmanagar	2 JFMCs
Sepahijala	Bishalgarh	1 JFMC
	Sonamura	2 JFMCs
South Tripura	Trishna Wildlife Sanctuary	1 EDC
Unakoti	Kumarghat	2 JFMCs
West Tripura	Mandai	2 JFMCs
	Sadar	2 JFMCs
Total		14 JFMCs, 1 EDC, 2 RGVs

Source: Results of interview with JFMCs/EDCs/RGVs

Responses regarding qualitative effects related to effectiveness were obtained from each JFMC/EDC/RGV interviewed by asking how much had been changed by the implementation of this project with answers on a scale of five: “Improved a lot,” “Improved,” “Improved to some extent,” “Same” and “Worsened.” The results of the five-scale evaluation were as follows.

Table 21: Five-scale Evaluation of the Project Effects by JFMCs/EDCs/RGVs

Item	Improved a lot	Improved	Improved to some extent	Same	Worsened
1) Forest restoration	5	11	1	0	0
2) People’s awareness of forest protection	4	13	0	0	0
3) Water and soil conservation	11	5	1	0	0
4) Biodiversity conservation	7	4	6	0	0
5) Improvement of living standards of residents (Diversification of livelihood means and Income increase)	2	12	3	0	0

Source: Results of interview with JFMCs/EDCs/RGVs (Effective number of responses: 17)

As seen above, responses for all of the items were as improved, and there were no responses saying “Same” or “Worsened.” The details of the changes observed are as follows.

¹⁷ The 17 groups were selected from groups located in places that could be visited during the survey period in each district, were groups actively engaged in activities and not introduced by TFD. The interviewees were not limited to the executives of each group and the members were invited to participate freely in the interview survey. As a result, almost 50 or more members participated in each group and there was no bias in age or sex among the interviewees. During the interview, not only executives but also a wide range of participants of both age and gender spoke.

Table 22: Any Changes Observed

Item	Any changes observed
1) Forest restoration	➤ The forest area has increased, the number of plant species in the forest has increased, and the shade due to the increased number of plants has increased.
2) People's awareness of forest protection	<ul style="list-style-type: none"> ➤ According to JFMCs, deforestation in the target area is managed by JFMCs, and only permitted bamboo is harvested. ➤ According to EDCs, logging in the wildlife sanctuary was originally prohibited, but no logging by EDC members has taken place. ➤ According to RGVs, there has been no shifting cultivation by RGV members since the project was implemented. ➤ Nearly all JFMCs/EDCs/RGVs interviewed indicated that the implementation of the project has strengthened community ties and fostered a sense that the forests and natural resources around the community are their property and should be protected by the community. In addition, there was the opinion that this project had also strengthened the connection between communities and TFD.
3) Water and soil conservation	<ul style="list-style-type: none"> ➤ The construction of the check dams has created reservoirs in hilly areas, increased the amount of water available, and made water available throughout the year. In addition, the installation of wells and water tanks has made safe drinking water available. ➤ The amount of water in the soil has increased, the cultivation of vegetables has improved. Irrigation has also improved, enabling a second crop of rice, which was the first crop in the past.
4) Biodiversity conservation	<ul style="list-style-type: none"> ➤ The number of sightings of wild animals (monkeys, deer, wild boars, foxes, wild cats, hares, porcupines, Indian bison, snakes, etc.) and birds has increased, and crop damage by wild animals has also increased. ➤ According to the Wildlife Census, there was an increase in the number of major wildlife species in Tripura. The results from the Wildlife Census in 2002 and 2014 showed that the number of leopards had increased from a small number to 29, the number of barnacles had increased from 598 to 690, the number of elephants had increased from 31 to 40, the number of clouded leopards had increased from 12 to 31, and the number of binturongs had increased from a small number to 28.
5) Improvement of the living standards of residents (Diversification of livelihood means and Income increase)	<ul style="list-style-type: none"> ➤ Many forest dwellers who are members of JFMCs/EDCs/RGVs had no access to cash income other than from the sales of forest resources, small amounts of crops, and day labor on government-implemented projects, and their income was very limited, to around 3,000 rupees per month. However, income was dramatically increased through wages for afforestation and small-scale infrastructure development activities under this project. ➤ IGAs by SHGs have made new cash income from aquaculture, pig farming, poultry farming, etc. possible. ➤ The income from the sales of bamboo, broom grass, incense material planting and agroforestry has increased. In addition, through this project, a purchase system for bamboo and broom grass was established, and broom grass can now be sold at 45 to 60 rupees per kg, up from 30 rupees or less per kg, when sales were made at the price quoted by the vendors.

Source: Results of interview with JFMCs/EDCs/RGVs, Questionnaire response by TFD

Furthermore, according to the results of the social impact survey conducted by Tripura University,¹⁸ the following positive changes were observed in social awareness and behavior as well as in the access to amenities for target residents before and after the implementation of the project.

¹⁸ See Note 14. The sample was conducted with 45 SHGs and 134 SHG members in Gomati, Khowai and West Tripura Districts. The sampling method is unknown because it is not described in the survey report.

Table 23: Changes among the Target Residents Before and After the Project

Item	Rate of residents who answered 'Yes'	
	Before	After
Yardstick for social awareness and behavior		
Confidence in facing problems	25%	85%
Confidence in facing financial crises	25%	77%
Helping neighbors	63%	72%
Taking decisions	49%	68%
Access to amenities		
Medical	37%	86%
Sanitation	46%	76%
Water supply	9%	37%
Sending children to schools	56%	77%
Adequate market	22%	73%
Transport	73%	76%

Source: Questionnaire response by TFD

As mentioned above, certain effects were confirmed in the qualitative effects related to effectiveness: 1) Forest restoration; 2) People's awareness of forest protection; 3) Water and soil conservation; 4) Biodiversity conservation; and 5) Improvement of the living standards of residents (Diversification of livelihood means and Income increase).

3.3.2 Impact

3.3.2.1 Intended Impacts

As referred to in "3.1.2 Consistency with Development Needs" of the Relevance, according to the *India State of Forest Report*, the dense forest rate in the total forest area of Tripura increased from 60.5% in 2007 to 76.2% in 2017, while the open forest rate reduced from 39.5% to 23.8%. This indicates that the increase in the area of dense forest promoted forest regeneration and improved forest degradation in the state. Furthermore, the poverty rate of Tripura decreased from 34.4% in 2006 to 14.1% in 2013, which indicates that the poverty situation in the state has improved.

In addition, regarding the qualitative effects related to impact: 1) Improvement of the natural environment; 2) Improvement of the social and economic capacities of women; and 3) Poverty reduction, change for each JFMC/EDC/RGV interviewed was examined on the five-scale evaluation in the same way as for the qualitative effects related to effectiveness. The results of the five-scale evaluation were as follows.

Table 24: Five-scale Evaluation of the Project Effects by JFMCs/EDCs/RGVs

Item	Improved a lot	Improved	Improved to some extent	Same	Worsened
1) Improvement of the natural environment	8	7	2	0	0
2) Improvement of the social and economic capacities of women	2	11	4	0	0
3) Poverty reduction	3	10	4	0	0

Source: Results of interview with JFMCs/EDCs/RGVs (Effective number of responses: 17)

As seen above, all of the items were judged to have been improved, and no responses said “Same” or “Worsened.” As for the details of the changes observed, in terms of 1) Improvement of the natural environment, environmental improvement with the increase of forest area and water content in the soil was mentioned.

In terms of 2) Improvement of the social and economic capacities of women and 3) Poverty reduction, the members of SHGs are mostly women, and very few had personal accounts in financial institutions prior to the implementation of the project. The SHG accounts were opened by the project and small-scale loans for IGAs were provided by JFMCs. Furthermore, due to difficulties in borrowing from financial institutions, borrowing used to take place from individual lenders at high interest rates, such as 10% per month, when necessary. However, formal loans from financial institutions have been approved as SHGs, and 258 SHGs have actually borrowed funds, amounting to 320 loans with 19.5 million rupees. In addition, according to the results of the social impact survey conducted by Tripura University, 6% of SHGs have started new profit-making businesses such as sundries stores, dried fish sales, lemon cultivation, etc. using funds obtained from IGAs.

As mentioned above, certain effects were also confirmed in the qualitative effects related to impact: 1) Improvement of the natural environment; 2) Improvement of the social and economic capacities of women; and 3) Poverty reduction.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

The impact on the natural environment is described in “3.3.2.1 Intended Impacts” above. There were no reports of undesirable effects of the project on the natural environment.

(2) Resettlement and Land Acquisition

The resettlement of residents and land acquisition by this project were not planned and did not occur.

This project has mostly achieved its objectives. Therefore, the effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional / Organizational Aspects of Operation and Maintenance

The executing agency of this project is TFD, and the operation and maintenance system of TFD at the time of ex-post evaluation had been taken over by the implementation system in the ongoing SCATFORM, which is the successor to this project. PMU continues to exist at the state level, and under PMU, there is a management system consisting of District Offices, Sub-division Offices, Wildlife Sanctuary Offices, Range Offices and Beat Offices.¹⁹

The following tables show the number of offices, officers and staff of TFD at each administrative level in the project target area, and the roles and responsibilities, supervisors in charge and reporting systems at each forest administrative level. According to TFD, there is no shortage of personnel in the current system, and there is no problem with the roles and responsibilities or with the reporting systems.

Table 25: Number of Offices, Officers and Staff of TFD in the Project Target Area

Administrative level	Number of offices	Number of officers	Number of staff
State (PMU)	1	16	58
District	7	7	35
Sub-division	16	16	111
Wildlife Sanctuary	3	3	20
Range	59	59	295
Beat	283	280 ^{Note 1}	566
Total	369	381	1,085

Source: Questionnaire response by TFD

Note 1: For some beats, two beats are taken by a single office manager.

Note 2: The total number of staff of TFD, including those outside the project area, was 2,331 as of November 2019.

Table 26: Roles and Responsibilities, Supervisors in charge and Reporting Systems at Each Forest Administrative Level

Administrative level	Roles and responsibilities	Supervisors in charge	Reporting system
State/PMU	Giving directions and supervising the entire state	Principal Chief Conservator of Forest (PCCF) Chief Wildlife Warden (CWLW) Additional PCCF Chief Conservator of Forest (CCF)	Submission of monthly reports from district offices
District	Supervising sub-division offices within the jurisdiction	District Forest Officers (DFO)	Submission of monthly reports from sub-division offices and wildlife sanctuaries within the jurisdiction
Sub-division	Supervising range offices within the jurisdiction	Sub-division Forest Officers (SDFO)	Submission of monthly reports from range offices within the jurisdiction

¹⁹ In April 2018, after the completion of this project and just before the start of SCATFORM in October 2018, a change of government took place in Tripura. As a result, the staff of TFD recruited by state government and JFMC leaders resigned and PMU was temporarily closed. However, each post was reassigned to the same personnel as before, or replaced by new personnel.

Administrative level	Roles and responsibilities	Supervisors in charge	Reporting system
Wildlife Sanctuary	Supervising EDCs in the sanctuary	Wildlife Wardens (WLW)	Submission of monthly reports from range offices within the jurisdiction
Range	Supervising beat offices within the jurisdiction	Range Officers	Daily base reports from beat offices within the jurisdiction
Beat	Supervising JFMCs in the jurisdiction (beat officers serve on JFMC boards in the jurisdiction)	Beat Officers	Participation in JFMC regular meetings within the jurisdiction, Daily base reports from Field Facilitators

Source: Questionnaire response by TFD

NCE established under this project also continues to exist and function as a research center for forest protection and biodiversity conservation, operating the “Crafts & More” stores that sell handicrafts, with eight stores in Tripura at the time of ex-post evaluation, and procuring the raw materials for brooms, etc. After the completion of the project, NCE was approved as an independent body under the *Societies Registration Act* with six dedicated staff members as well as its own budget allocated by the state. SCATFORM also provides financial assistance to NCE for its operations. However, the financial assistance is provided only for the first five years of the 10-year project period, and the remaining five years will be managed with NCE’s own budget. NCE is developing measures to strengthen its self-supporting profitability under the guidance of the project management consultants responsible for SCATFORM’s consulting services.

As mentioned above, while the staff at each administrative level of TFD is responsible for management works in the area of which they are in charge, field workers such as Community Organizers, Livelihood Coordinators and Field Facilitators continue to communicate and provide guidance to JFMCs/EDCs/RGVs at the field level. These field workers are also employed in SCATFORM and continue to carry out their activities.

All of the 463 JFMCs/EDCs/RGVs established in this project were still in existence at the time of ex-post evaluation, and they are engaged in JFM in their target area under the same system as during the project implementation. Some JFMCs/EDCs/RGVs continue to be supported in SCATFORM. Among IGAs by SHGs, aquaculture, pig farming, poultry farming, the production of brooms and incense sticks, etc. are ongoing to a certain extent even after the completion of the project, but the production and sales of handweaving, weaving and handicrafts have been suspended after project completion due to lack of market access. However, only 15 of the 1,549 SHGs were engaged in the production and sales of handweaving, weaving, and handicrafts, which is considerably less than the number of groups engaged in pig farming (1,116 groups) and aquaculture (736 groups), and thus it can be said that the proportion of discontinued activities among the total activities is small.

3.4.2 Technical Aspects of Operation and Maintenance

The consulting services implemented in this project provided technical support for PMU and NCE, support for procurement operations for PMU, support for fund management, annual plan development, report preparation, etc. for PMU, and assistance in reviewing and developing the JFMC management manual, etc. Management training was also provided for officers and staff at each level of TFD. According to TFD, the training manuals developed by the project were still being used at the time of the ex-post evaluation, and there were no particular technical problems. Refresher training is required for officers and staff appointed to TFD after the completion of the project, and the training for these officers and staff is planned to be conducted in SCATFORM.

GIS and MIS introduced in this project are also used in SCATFORM and it is planned that they will be integrated with the database in the office of TFD (separate from the PMU office). The location information for each JFMC/EDC/RGV and the facilities and check dams constructed by the project is recorded, and it is possible for the persons involved in the project to access the database in which the information is input through the website “Tripura JICA Project” (only registered members can access the database). At the facilities and check dams, staff at the Beat offices regularly take pictures and upload them to the database so that the current conditions of the facilities can be known.

In addition, NCE is in the process of developing a plan to strengthen the sales of handicrafts and NTFP in order to strengthen the operation of Crafts & More through the consulting services of SCATFORM. As part of the marketing strengthening measures, PMU plans to grow organic lemons in agroforestry and introduce bamboo cups procured from JFMCs to use as cups for in-house beverage sales for the railway that recently opened in Tripura. Negotiations are taking place with those concerned at the railway company.

At JFMC/EDC/RGV level, the JFMC management manual prepared by this project is used, and IGAs by SHGs are continuing. SHG members received technical training for conducting their IGAs such as in aquaculture, pig farming, and handicraft production, but at the time of the ex-post evaluation there are new, technical, needs for the continuance of their activities. These included, for example, how to deal with livestock diseases in pig farming, and how to create new markets in the production and sales of handicrafts. PMU recognizes these needs and plans to strengthen the marketing for handicrafts as part of NCE’s efforts to strengthen the sales of Crafts & More.

3.4.3 Financial Aspects of Operation and Maintenance

The annual operating budget (Amount of budget and amount of execution) of TFD from 2017/18 to 2019/20 is shown in the table below. The budget for the operation and maintenance

of TFD at the time of ex-post evaluation is sufficient, as is the number of staff, partly because of funding from SCATFORM.

Table 27: Annual Amounts of Budget and Expenditure of TFD

Unit: Rupees			
Item	2017/18	2018/19	2019/20
Total budget of TFD	1,165,952,300	1,073,956,000	1,397,977,000
Total spending of TFD	1,033,722,100	946,187,600	784,099,500
Budget for operation and maintenance	20,000,000	106,405,000	500,000,000
Total spending for operation and maintenance	10,901,400	12,903,400	5,967,000 ^{Note}

Source: Questionnaire response by TFD

Note: Amount expended by September 2019

During the implementation of the project, PMU utilized funds from other schemes such as the North East Rural Livelihoods Project (NERLP) by the Ministry of Development of North Eastern Region and the Tripura Rural Livelihoods Mission (TRLM) by the Tripura Rural Development Department in addition to the fund of MGNREGA to implement project activities such as small-scale infrastructure development, livelihood improvement support, agroforestry, etc. Even after the completion of the project, PMU continues to work with other schemes, and the funds from other schemes are being used for the maintenance of this project.

At the JFMC/EDC/RGV level, no special funds are required to maintain and manage forests, so there no particular opinion that funds for activities were insufficient was given at the interviews with JFMCs/EDCs/RGVs. As mentioned above, among IGAs by SHGs, while aquaculture, pig farming, poultry farming, the production of brooms and incense sticks, etc. have been stable sources of income for members, even after the completion of the project, the production of handweaving, weaving and handicrafts has been suspended. As mentioned above, NCE plans to create and strengthen the market for these handicrafts as part of its efforts to strengthen the sales of Crafts & More.

3.4.4 Status of Operation and Maintenance

As mentioned above, under the ongoing SCATFORM, the operation and maintenance of the project is being managed mainly by PMU. At the field level, the field workers continue to be in charge of communication and guidance to JFMCs, EDCs, and RGVs, and there are no particular problems regarding the status of operation and maintenance.

No major problems have been observed in the institutional / organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, the sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project was to rehabilitate the forests in Tripura, a state in northeastern India, and raise the income of the local residents by extending assistance to participatory afforestation and to those engaged in shifting cultivation, as well as to preserve the biodiversity of the region, thereby contributing to regional environmental improvement and poverty alleviation.

The project was highly relevant to the development plan and development needs of India at the times of appraisal and ex-post evaluation, as well as to Japan's ODA policy at the time of appraisal, so its relevance is high. While the project cost was within the plan, the project period exceeded the plan. Outputs were produced almost as planned and the efficiency was fair. Through afforestation, community development and livelihood improvement activities, support for the shift of livelihoods to shifting cultivators, biodiversity conservation activities, etc. were conducted through the project. It was confirmed that there were effects such as forest restoration, water and soil conservation and biodiversity improvement in the target area as well as creation of employment, diversification of the means of livelihood and increase in the income of local residents. In addition, it was confirmed that improvements in forest restoration, water and soil conservation, and biodiversity had contributed to the improvement of the natural environment of the region and that the increase in the income of the local residents had contributed to improvement in the social and economic capacities of women as well as to poverty reduction in the region. Therefore, the effectiveness and impact of the project are high. After the completion of the project, the operation and maintenance system was taken over by the implementation system of the ongoing SCATFORM which is a successor to the project. The PMU established in the project continues to exist and the management system of the PMU is in place. No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, the sustainability of the project effects is high.

In light of the above, the project is evaluated as highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Among IGAs conducted by SHGs to support the livelihood improvement aspect of this project, while activities such as aquaculture, pig farming, poultry farming, production of brooms and incense sticks, etc. have been conducted more or less continuously, even after the completion of the project, providing a stable source of income for the target residents, the production and sales of handweaving, weaving and handicrafts were suspended after the completion of the project due to lack of market access. As a measure to address this issue, NCE, which became an

independent organization after the completion of the project, is operating “Crafts & More” stores that sell handicrafts, etc. and is planning to strengthen the operation and sales of these stores as well as to create and strengthen the market for these handicrafts.

Therefore, it is recommended that TFD consider the following: 1) Conduct detailed market research on NTFP including handicrafts using the consulting services of SCATFORM and prepare a business plan; 2) Based on the prepared business plan, instruct the Livelihood Coordinators to support each SHG for the preparation of individual business plans so that they can apply for a loan to a financial institution; and 3) Utilize funds from other schemes in cooperation with other departments such as the Rural Development Department, Agriculture Department and Commerce Department, in the same way as in this project, in order to strengthen marketing and sales through the creation and expansion of the market for handicrafts, as well as for the enhancement of the quality of products, and the development of new products.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) Contribution to poverty reduction through active collaboration with other departments and the strategic use of funds from other schemes by the executing agency

The project contributed to raising the income of beneficiaries by focusing on livelihood improvement support including IGAs by SHGs and contributed to reducing poverty in the region to a greater extent than other similar projects. While support for improving livelihoods is not a direct task of the Forest Department, TFD/PMU recognized the importance of improving livelihoods, actively collaborated with other departments such as the Rural Development Department, Agriculture Department and Commerce Department, and strategically used funds for supporting rural development and livelihood improvement of other schemes such as MGNREGA, NERLP and TRLM in order to carry out its project activities, thus contributing to the realization of the effects.

In this regard, in order to ensure that the initiative by the executing agency to obtain funds from other schemes is exerted in other loan aid projects as well, when JICA forms a similar project in the future, if it recognizes the funding programs of governments, international organizations, donors, NGOs, etc. that can be utilized in the target country/region, examines the linkage with these funding programs at the time of the formulation of the plan, and encourages the executing agency to plan to provide co-financing in the implementation of specific project activities, this will lead to smooth coordination during the implementation of the project.

(2) Necessity to inform the executing agency that data for the Operation and Effect Indicators are the basis of monitoring and evaluation tools

While some of the outputs were changed in this project, the changes were made through an appropriate process based on discussion and agreement between JICA and PMU. However, while the target values for “Afforestation area,” “Number of JFMCs established” and “Training lecture attendees” in the Operation and Effect Indicators should have been adjusted according to these changes, the official procedure for changing the target values was not carried out. Furthermore, although the impact surveys were conducted by external organizations for monitoring and evaluation of the project, the exact data on “Survival rate,” “Production of forest products” and “Increase in income per beneficiary household” was not collected or was not reliable even if it was collected.

Meanwhile, TFD pointed out the need to set indicators and benchmarks for project monitoring in the ex-post evaluation. TFD did not fully understand that the data of the Operation and Effect Indicators formed the basis for the monitoring and evaluation of the project, and this resulted in insufficient management of target values and collection of exact data. Therefore, JICA needs to inform the executing agency that the Operation and Effect Indicators set at the time of planning are important tools for monitoring and evaluation and that data should be regularly collected in project monitoring to evaluate the effectiveness and impact of the project based on the results of the data collected. Furthermore, it is desirable that the services provided by the project management consultants are specified in the TOR in order that they should provide guidance to the executing agency and external organizations on how to conduct the impact survey and how to collect the data on Indicators, which is conducted by external organizations entrusted to the work by the executing agency.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	<p>(1) Forest Rehabilitation and Development</p> <p>AR 15,500 ha</p> <p>ANR..... 35,280 ha</p> <p>Conversion of monoculture .220 ha</p> <p>Total 51,000 ha</p> <p>Agroforestry 8,297 ha</p> <p>(2) JFM Community Development</p> <p>Establishment of JFMCs 410</p> <p>Establishment of SHGs 1,400</p> <p>Construction of check dams . 2,419</p> <p>(3) Rehabilitation for RGVs of Shifting Cultivators</p> <p>Establishment of RGVs 16</p> <p>(4) Biodiversity Conservation</p> <p>Establishment of EDC..... 30</p> <p>Ecotourism development..... 5</p> <p>(5) Supporting Activities</p> <p>Training provision . 90,147 persons</p> <p>(6) Consulting Services</p> <p>International..... 63M/M</p> <p>Local..... 128M/M</p>	<p>(1) Forest Rehabilitation and Development</p> <p>AR..... 15,667 ha</p> <p>ANR 37,377 ha</p> <p>Conversion of monoculture. 176 ha</p> <p>Total 53,220 ha</p> <p>Agroforestry 8,455 ha</p> <p>(2) JFM Community Development</p> <p>Establishment of JFMCs 417</p> <p>Establishment of SHGs..... 1,549</p> <p>Construction of check dams . 2,513</p> <p>(3) Rehabilitation for RGVs of Shifting Cultivators</p> <p>Establishment of RGVs 16</p> <p>(4) Biodiversity Conservation</p> <p>Establishment of EDC 30</p> <p>Ecotourism development 5</p> <p>(5) Supporting Activities</p> <p>Training provision. 99,473 persons</p> <p>(6) Consulting Services</p> <p>International..... 63M/M</p> <p>Local 128M/M</p>
2. Project Period	March 2007 – March 2015 (97 months)	March 2007 – March 2017 (121 months)
3. Project Cost		
Amount Paid in Foreign Currency	617 million yen	NA
Amount Paid in Local Currency	8,599 million yen (3,657 million rupee)	(3,035 million rupee)
Total	9,216 million yen	5,771 million yen
ODA Loan Portion	7,725 million yen	NA
Exchange Rate	1 rupee = 2.52 yen (As of September 2006)	1 rupee = 1.90 yen (Average between January 2007 and December 2017)
4. Final Disbursement	July 2017	