India

FY2018 Ex-post Evaluation of Japanese ODA Loan

"Orissa Forestry Sector Development Project"

External Evaluator: Junko Noguchi

Foundation for Advanced Studies on International Development

0. Summary

This project aimed at restoring degraded forests and improving livelihood level of villagers by promoting sustainable forest management, including participatory afforestation and community/tribal development in the Odisha State[1] in the eastern part of India, thereby contributing to environmental improvement and poverty alleviation. As this objective was consistent with the development policies and needs of the government of India and Odisha as well as Japan's ODA policy, the project relevance is high. Although the project period was extended for two years, the objective and contents of the added plan were appropriate and additionally intended outputs were produced. Thus, efficiency is high. In the project, afforestation activities were implemented more than planned under the mode of Joint Forest Management (JFM), and the survival rate of planted trees and forest density were improved. Also, the production of forest products and incomes of beneficiary forest farmers increased. As a result, gender-related and political impacts were brought about. Therefore, the project effectiveness/impact is high. Regarding sustainability, there have not been major issues in either the executing agency or communities. Thus, sustainability is high.

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

1. Project Description

Odisha State

Forestry after 9 years of afforestation (left side of the boundary)
(Angul Division, Bhaliapal Mandarapur)

[1] Orissa was renamed Odisha in 2009. In this report, Orissa is used in the project title, and Odisha is used in other parts.

1.1 Background

The Odisha State is located in the middle-eastern part of India and has a population of 41.97 million (2011). The forest area, which extends to the Eastern Ghats, Central Plateau and Northern Plateau, is 58,140 km^2, accounting for 37.6% of the total area of the state (2017). Odisha is classified as one of the most forest-abundant states in India.

In the Odisha State, degradation of forests is a concern, and restoration of degraded forests was a major topic in its development plan. Moreover, the Odisha State had the highest poverty rate of any states in India (39.9% in 2005), and there was a particularly high proportion of scheduled tribes who relied on the forests in the project area. Degradation of forests would threaten such people's livelihoods. Also, it was pointed out that degradation of forests would cause the decline of functions of water recharge and soil conservation of the forest ecosystem and that natural disasters such as floods and insufficient agricultural water would lead to a decrease in crop yields. Forest conservation through mitigation of degraded forests, which had a close relationship with people's livelihoods, was an urgent issue.

1.2 Project Outline

The objective of this project is to restore degraded forests and improve the income level of villagers by promoting sustainable forest management including JFM plantation and community/tribal development in the Odisha State, thereby contributing to environmental improvement and poverty alleviation.

Loan Approved Amount/ Disbursed Amount	13,937 million yen / 12,126 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2006 / March 2006
Terms and Conditions	Interest Rate 0.75%
	Repayment Period 40 years (Grace Period 10 years)
	Conditions for Procurement General untied
Borrower/ Executing Agency	President of India / Odisha Forest Department
Project Completion	March 2015
Target Area	14 Divisions in the Odisha State
Main Contractor	None
Main Consultants	Sutra Consulting Pvt. Ltd., (India) / Nippon Koei Co., Ltd. (Japan) / Natural Resources International Ltd., (UK) (JV), Bhubaneshwar Centre for Professional Expertise Development (India)

Related Studies (Feasibility Studies, etc.)	Special Assistance for Project Formulation for Orissa Forestry Sector Development Project
Related Projects	ODA Loan Project "Odisha Forestry Sector Development Project Phase II" (March 2017)

2. Outline of the Evaluation Study

2.1 External Evaluator

Junko Noguchi, Foundation for Advanced Studies on International Development

2.2 Duration of Evaluation Study

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

Duration of the Study: November 2018 – October 2019

Duration of the Field Study: March 3-15, 2019, June 1-7, 2019

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Consistency with the Development Plan of India

In the *Tenth Five Year Plan* (2002-2007), the government of India placed a priority on increasing the forest cover rate[4] and restoring the degraded forests. It was expected in the plan that JFM, wherein the local state forest department and communities living on forest fringes jointly manage the forests, would achieve sustainable forest management and alternative income means for forest dependents to improve their livelihoods. The Common Minimum Programme announced by the government at that time also assigned priority to investment in employment-creating afforestation projects.

Regarding the development policy at the time of ex-post evaluation, in the *Three Year Action Agenda* (2017-2019) that succeeded the abovementioned plan, the necessity of economic growth for poverty reduction was emphasized. The Agenda's strategies in the forest sector included promotion of afforestation projects through the stored monitoring information via information monitoring with the Geographic Information System (GIS) and its diffusion, encouragement of the forest product markets and investment in the forests through deregulation on tree felling and sales, protection of the ecosystem by controlling industrial plantation and invasive alien species, etc. The Forest Department of the Odisha State, under the *Forest Vision 2020*, has been promoting extension of the forest area, improvement of the forest condition,

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ③: High, ②: Fair, ①: Low

[4] The target was to increase the ratio of the forest area to the total area of the nation, 25% and 33% by 2007 and 2012, respectively.

sustainable forest management by strengthening JFM, biodiversity conservation, livelihood improvement of the people living on forest fringes, etc.

From above, it can be said that the project was consistent with the development policies of the government of India and Odisha at the time of both the appraisal and ex-post evaluation.

3.1.2 Consistency with the Development Needs of India

At the time of appraisal, the forest cover rate[5] in India was 23.7% in 2003, which fell short of the world average of 29.6%. A large number of people, including the poor, depend on forest land for fodder, fuel, and income. The growth of the population was causing strains on the forest lands, which deteriorated forests every year. Furthermore, due to deterioration of soil and water capacities, the decreased water table levels led to shortages of irrigation and drinking water, which exerted pressure on the people living in poverty. This further increased their dependence on the forests, a vicious cycle. Degraded forests would threaten such people's livelihood. They would also reduce forest functions such as water recharge and soil conservation, which would cause decreases in crop yield due to natural disasters such as flooding and insufficient agricultural water. Forest conservation through mitigation of degraded forests, which had a close relationship with the people's livelihood, is an urgent issue. Due to illegal logging and excessive harvesting, situations of forest degradation did not fully improve. In 2017, at the time of ex-post evaluation, the percentage of open forest was 42.6%.

In the Odisha State, although the forest cover rate increased from 31.1% in 2005 to 33.0% in 2017, the amount of open forest increased from 41.7% to 44.8% during the same period. Forest degradation has been still regarded as a problem at the time of ex-post evaluation In addition to the increasing trends of livestock grazing and collection of non-timber forest products (NTFPs) as income sources, firewood has continued to be used as fuel in areas where gas is scarce, and thus dependence on forests has remained[6].

From above, it can be said that the project was consistent with the development needs of India at the time of both the appraisal and ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

In the *New Medium-Term Strategy for Overseas Economic Cooperation Operations* (2005),

[5] According to the Forest Survey of India, forests are areas with tree canopy (the upper layer formed by mature tree branches and leaves) densities of more than 10%. The ratio of this area to the whole area is the forest cover rate. Forests are classified as open forests (tree canopy densities of more than 10%) and dense forests (tree canopy densities of more than 40%). Areas with canopy densities of less than 10% are called scrubs. At the time of the ex-post evaluation, dense forests were subdivided into moderately dense forests with tree canopy densities of more than 40% and very dense forests with tree canopy densities of more than 70%.

[6] Interview survey with the executing agency.

priority areas in providing support to India included "regional development in which the poor receive benefit" and "responses to environmental issues" for poverty reduction through sustainable development. In the "Country Assistance Program for India" (2006)[7], one of the priority areas was "improvement of poverty and environmental issues." Regarding assistance in the forestry sector, a comprehensive approach combining promotion of participatory afforestation, assurance of alternative income sources of residents living on forest fringes, support for education, health, agricultural development and others was considered. Before the program was approved in 2006, one of the priority areas of economic cooperation was "sewage facility development and improvement of water supply in the urban areas and environmental conservation such as support for afforestation in the rural areas," and one of the priority objectives was "improvement of poverty and environmental issues."

From above, the project was consistent with Japan's ODA policy at the appraisal time.

3.1.4 Appropriateness of the Project Plan and Approach

It was found out that project cost was reduced by the time of original project completion, due to fluctuations in exchange rates. Then, after an examination of alternative plans for savings utilization, the project period was extended for 2 years (3.2.2.2). Target villages were added, and additional activities were implemented to ensure sustainability. However, there was no change in the original approach for restoration of degraded forests and increase in the people's income levels through afforestation and livelihood improvement activities.

In light of the above, this project was highly relevant to India's development plan and development needs, as well as Japan's ODA policy. The extension of the project period was appropriate. Therefore, its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs[8]

3.2.1.1 Restoration of Degraded Forests

JFM forest management, Non-JFM forest management (managed by the Forest Department) and farm forestry were implemented in 11 districts as planned. JFM is literally a forest management method implemented by collaboration of the community forest management committee (*vana suraksha samiti*: VSS) and the Forest Department. In the Odisha State, JFM has been promoted since the state resolution in 1993. In the project, JFM was implemented in the following procedure; i) an existing VSS was reactivated or a new VSS was formed, ii) an

[7] The "Country Assistance Program for India" was approved in May 2006. However, a draft had already been developed by November 2005. Therefore, consistency with the program was confirmed.
[8] A comparison between the planed and actual outputs is shown in the table on the last page.

official agreement was exchanged with the Forest Department, iii) the micro plans (forest management plans) including afforestation activities were formulated and implemented, and iv) monitoring was implemented.

3.2.1.2 Coastal Plantation

Mangrove and casuarina plantations were implemented in the coastal area in two wildlife (WL) divisions so as to mitigate damages from natural disasters such as hurricanes and tsunami. Mangrove and casuarina were planted in areas of 2,769 ha and 151 ha against the planned areas of 2,100 ha and 650 ha, respectively. The land used was more than planned because more environmental development committees (EDCs) were formed than planned. Regarding casuarina, it was planted less than planned, as there were fewer suitable sites for plantation than originally expected due to erosion in the coastal areas. However, since the target divisions has been damaged less than other areas by Cyclone *Phailin* in 2013[9], the planted casuarina functioned as disaster-prevention forests.

3.2.1.3 Biodiversity Management

- Ecotourism Development

It was planned that five sites would be selected as tourism destinations in one WL division. Actually, seven sites were selected for potential ecotourism development in three WL divisions.

- Mitigating Human-Animal Conflict

Originally, construction of guide walls, guide trenches and watering holes and feed cultivation along elephant corridors were planned, targeting areas where conflicts between elephants and humans happened frequently, but these were not completed by the project completion date. This is because the construction plan submitted by the Forest Department to the state government was not approved, as it required much time for land acquisition and coordination with the related ministries and organizations[10]. Furthermore, the plan formulation and approval were hindered by elephants' habitat conditions and changes in their moving routes[11]. Feed cultivation and construction of watering holes were not implemented because the guide walls and trenches for elephants were not constructed. On the other hand, photovoltaic fences were constructed to prevent wild animals (deer, boars, and so on) from entering forests and farmlands. Fifty-one wild animal rangers were trained against the planned 80. Wild animal

[9] Questionnaire response from the executing agency.
[10] Questionnaire response from the executing agency. The plan was not approved as of the time of the ex post evaluation.
[11] Interview survey with the executing agency. Same explanation is on the website of Odisha Wildlife Organization.
<https://www.wildlife.odisha.gov.in/WebPortal/Corridors.aspx?AspxAutoDetectCookieSupport=1>
(Accessed on June 4th, 2019.)

rangers selected from among EDC members were expected to collaborate with forest officers to mitigate conflicts between humans and wild animals. Fewer wild animal rangers were trained because needs were lower than expected, which, however, did not affect activity implementation and effects[12].

- Establishment of Community Reserves and Heritage Sites[13]

Two community reserves and heritage sites were established, less than the planned five. This is because there were fewer sites adjacent to the community reserves or heritage sites than originally expected. On the other hand, many sacred groves[14], which serve the same purpose of biodiversity conservation through community participation, were established.

3.2.1.4 Community/Tribal development, including capacity building of VSS

2,426 of VSS and EDCs were formed. The reason for exceeding the plan (2,275) was that 150 (125 VSS and 25 EDCs) were additionally established during the extended period. Much more self-help groups (SHGs) for income generation activities (IGAs) were formed because there were more groups which showed an interest in IGA and met selection criteria[15] in the target VSS/EDCs.

Table 1. Formation of VSS/EDCs and SHGs

	Plan	Actual
Formation of VSS/EDCs	2,275 (2,425)	2,426
Formation of SHGs	4,850 (5,150)	7,358
Trainees	33,500	63,164

Source: JICA internal documents, questionnaire responses from the executing agency.

Note: Planned figures in parentheses are the sum of the original plan and additional plan during the extended period.

Entry-point activities (EPAs) were implemented in all of the villages where VSS/EDCs were formed. Implemented EPAs included construction/repair of village temples (*mandaps*), development of water supply facilities construction of washing sheds, digging of tube wells, installation of streetlights, supply of agricultural equipment, etc. Also, quality-of-life improvement activities such as construction of improved cooking ovens, literacy classes, provision of mosquito nets, and malaria checkups were conducted. These activities not only directly met communities' needs but also promoted activation of VSS/EDCs and motivated JFM

[12] Questionnaire and interview responses from the executing agency.
[13] Community reserves and heritage sites are areas that should be protected as areas and routes adjacent or connected to national parks, wildlife reserves and protected forest areas.
[14] Sacred groves such as community temples are places that are sacred to community residents. For example, trees were planted in the boundary area to protect sacred groves' ecosystems.
[15] Questionnaire response from the executing agency.

activities, as they were planned and implemented in a participatory way[16]. Furthermore, depending on characteristics of EPAs, communities received support from the Health Department and Education Department. This was an approach taken by the project for collaboration for forest restoration as part of comprehensive community development.

3.2.1.5 Supporting Activities

The foundation for forest conservation activities was developed and strengthened as planned. As organizations for implementation, the Project Management Unit (PMU) was established, and project operation offices were established at division and range levels. The PMU was an independent entity with its own regulations on personnel, financial and managerial matters, which contributed to smooth budget disbursement and activity implementation[17]. Regarding forest surveys and research, five surveys were conducted on biodiversity, JFM and certain tree species, and the survey results were applied in activities including afforestation. As for infrastructure development, forest roads and linking roads were newly constructed or rehabilitated. Forest roads were rehabilitated about half as much as planned, but necessary roads were rehabilitated to assure access to all of the target communities[18].

3.2.2 Project Inputs

3.2.2.1 Project Cost

The planned project cost was 16,429 million yen (including 13,937 million yen as an ODA loan), and the actual cost was 15,515 million yen (including 12,126 million yen as an ODA loan), which was 94% of the planned cost, and the actual cost was within the plan. The breakdown of the project cost by output is shown in Table 2.

3.2.2.2 Project Period

The project period planned at the appraisal time was 84 months, from April 2006 to March 2013 (completion of afforestation activities and disbursements). The actual period was 108 months, from April 2006 to March 2015. After the project started, there were changes in exchange rates (yen higher and rupees weaker), which led to savings on project costs. Two savings utilization plans were submitted from the Forest Department to JICA India office in January 2012. One was for expansion of the target divisions, and the other was for the addition of target VSS/EDCs within the existing target divisions and activities to ensure sustainability. Based on the mutual discussion, the latter plan was approved by the JICA India office in March 2012, and the project period was extended for 2 years (24 months). Thus, the contents and

[16] Questionnaire response from the executing agency.
[17] Interview survey with the executing agency.
[18] Interview survey with the executing agency.

procedures of the additional plan were cleared. The ratio of the project period (108 months) including the extended one against the plan was 100%, and the additionally planned outputs were produced. Therefore, it can be confirmed that the total project period went as planned.

Table 2. Planned and Actual Project Costs

	Plan				Actual			
	Foreign currency	Local currency	Total		Foreign currency	Local currency	Total	
	Million yen	Million yen	Million yen	%	Million rupees	Million rupees	Million rupees	%
Restoration of degraded forests	0	6,476.6	6,476.6	39	0	3,338.4	3,338.4	42
Coastal plantation	0	319.9	319.9	2	0	147.1	147.1	2
Biodiversity management	0	314.6	314.6	2	0	84.0	84.0	1
Community/Tribal development including capacity building of VSS	0	3,055.0	3,055.0	19	0	1,840.8	1,840.8	23
Supporting activities	0	1,742.3	1,742.3	11	0	599.5	599.5	8
Price escalation	0	460.0	460.0	3	0	0	0	0
Physical contingency	0	618.4	618.4	4	0	0	0	0
Consulting services	164.3	351.9	516.2	3	91.0	232.0	323.0	4
Administration	0	2,025.5	2,025.5	12	0	1,285.1	1,285.1	16
Tax & Duties	0	466.8	466.8	3	0	61.4	61.4	1
Total	164.3	15,831.1	15,995.4	97	91.0	7,588.6	7,679.7	97
Interest during construction	433.3	0	433.3	3	222.9	0	222.9	3
Total	597.6	15,831.1	16,428.7	100	314.0	7,588.6	7,902.6	100

Source: JICA internal documents.

Note: Actual amounts in yen by foreign currency and local currency could not be confirmed. Information on exchange rates at the time of disbursement was not available, either. Thus, actual amounts were described in rupees.

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

At the time of appraisal, an economic analysis was conducted by calculating benefits of production of wood and timber, fuelwood production, agroforestry production, income generation from livelihood improvement and prevention of soil erosion. Supposing the project life as 40 years, the economic internal rate of return (EIRR) was 14.5%[19]. Applying the same formula with data provided by the executing agency at the time of the ex-post evaluation, recalculated EIRR turned out to be 19.1%. The increase in EIRR was attributed to increased benefits in the added target VSS/EDCs during the extended period, though the project cost was within the plan.

From above, the project cost was within the plan and the project period, including the extended period, was as planned. Therefore, efficiency of the project is high.

[19] At the ex-ante evaluation, the EIRR for a project life of 40 years in addition to the project period was calculated as 15.1%.

3.3 Effectiveness and Impacts[20] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects

(1) Effects of Forest Restoration

The total quantity of plants planted reached 942 million by project completion (Indicator 1), as shown in Table 3. This greatly exceeded the plan at the appraisal phase, based on the needs for tree species and quantity at each VSS. 323.20 million complementary plants (Indicator 2) were implemented (artificial regeneration plants[21] (AR): 94.20 million; farm forestry plants: 229 million), exceeding the plan at the time of appraisal, which called for 294.40 million (AR: 24.40 million; farm forestry: 270 million). The quantity of complementary AR planting was 10% of the total quantity of planting as expected at the time of appraisal. Much more planting was conducted than planned, which resulted in much more complementary planting than planned. Besides, 2.29 million complementary plants were grown as part of farm forestry. Although exact quantities of planting and complementary planting could not be confirmed during the extended period, they were all conducted based on the micro-plans reflecting village situations and needs. Actual planting was almost four times the planned amount, and therefore, it can be presumed that the actual plan exceeded the plan during the extended period as well. The quantity of planting and complementary planting in Table 3 shows the total quantity conducted each year. The reason for no planting or complementary planting since the time of project completion is that it has not been necessary yet, because natural regeneration has been enhanced[22].

As a result of planting and complementary planting, the total afforestation area reached 213,325 ha by the time of project completion (Indicator 3). As mentioned earlier, during the extended period, the planned afforestation area was extended by 10,375 ha in an added 125 VSS[23]. The achieved afforestation area including this added area exceeded the target area (209,875 ha). The figures have not changed consecutively because the total afforestation area is the areas within the JFM boundary of each VSS and the boundary has not been changed since the project completion.

In summary, planting was implemented more than planned, complementary planting was conducted as necessary and the total afforestation area exceeded the target as well.

---

[20] Sub-rating for Effectiveness is to be put with consideration of Impacts.

[21] Artificial regeneration (AR) is the planting of tree seedlings or seeds after a timber harvest to facilitate artificial tree growth. Natural regeneration includes trees that grow from seeds that fall and germinate in situ, without human intervention. Assisted natural regeneration (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.

[22] Questionnaire response from the executing agency.

[23] 10,375 ha was calculated by multiplying added 125 VSS by 83 ha (ANR 64 ha, economic 2 ha, fuel/fodder 2 ha, bamboo 1 ha, and NTFP 14 ha). JICA internal document.

Table 3. Actual Afforestation

	Baseline	Target[1)]	Actual			
	2005	2015	2015	2016	2017[3)]	2018
		2 years after completion	Comple-tion year	1 year after completion	2 years after completion	3 years after completion
1) Total quantity of planting (million)[2)]	N/A	244 (N/A)	942	942	942	942
2) Total quantity of complementary planting (million)[2)]	N/A	294.4 (N/A)	323.2	323.2	323.2	323.2
3) Total afforestation area (ha)	N/A	199,500 (209,875)	213,325	213,325	213,325	213,325

Source: JICA internal documents, data from the executing agency.

Note: [1)] Upper figures are the sum of the original plan and added plan for the extended period.
[2)] Actual figures for Indicator 1) and 2), are not figures of each year but total figures by each year
[3)] At the appraisal time, targets were set for 2015 (2 years after completion). Since the project period was extended, the plan was compared with the achievement in 2017.

Table 4 shows the survival rates of planted trees. The survival rate in 2015 was 70-80%, which were lower than the targeted 90%, because the rate was calculated for all planted trees regardless of the actual planting year—the year following completion of all planting was counted as the "first year after planting." In other words, the data for 2015 includes those areas in which trees were planted 2-4 years before, and thus, average data may be lower than the actual survival rate. Even though the survival rate was calculated in this way, the rate exceeded the target after 2016 (Indicator 4). Therefore, it can be judged that targets were achieved.

Table 4. Survival Rates of Planted Trees (%)

	Target					Actual				
	-	-	-	-	-	2014	2015	2016	2017	2018
	1 year after planting	2 years after planting	3 years after planting	4 years after planting	5 years after planting	1 year after planting	2 years after planting	3 years after planting	4 years after planting	5 years after planting
4) Survival rate (%)	90	90	70	65	60	N/A	70-80	70-80	70-80	65-75 (coastal) 70-80 (AR)

Source: Questionnaire response from the executing agency.

Note: Targets had been set not for a specific year but for years 1-5 after planting. In the project, afforestation activities were implemented from 2008 to 2013, but data were not available by planting year. Therefore, the year following completion of all afforestation was supposed as 1 year after planting, and the survival rate of all planted trees was confirmed.

Supplemental information obtained from 18 interviewed VSS/EDCs indicates similar situations in which the survival rates of coastal plantations and ARs were 70-90% and 60-80%,

respectively.

The following Table 5 shows the changes in forest density throughout all target sites[24]. It was planned at the time of appraisal that scrub areas and open forests would change to open forests and dense forests, respectively. According to the executing agency, that does not mean that all of the scrub areas and open forests would change to open forests and dense forests. The plan indicated only aiming to change the situation since it is impossible to realize that in such a short period[25]. In 2017, two years after the time of project completion, 60-65% of the scrub and open forests changed to dense forests (Indicator 5). Although the ratio of changes from scrub to open forests and from open forests to dense forests was not available, it can be confirmed that forest density was improved on the whole.

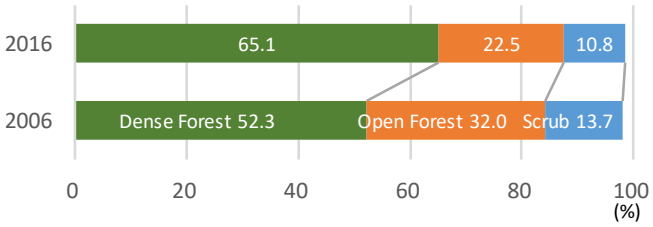
Table 5. Changes in Forest Cover Rate (%)

	Target	Actual			
	2015	2015	2016	2017[1)]	2018
	2 years after completion	Completion year	1 year after completion	2 years after completion	3 years after completion
5) Forest rate change	Scrub→Open Open→Dense	Scrub 50-60%→Open[2)] Open→Dense[3)]	Scrub/Open 55-60%→Dense	Scrub/Open 60-65%→Dense	Scrub/Open 60-70%→Dense

Source: Report prepared by and questionnaire response from the executing agency.

Note: [1)] At the appraisal time, targets were set for 2015 (2 years after completion). Since the project period was extended, the plan was compared with the achievements in 2017.
[2)] "Scrub 50-60%→Open" indicates that 50-60% of the scrub area at the time of appraisal changed to open forests in 2015. Figures were estimated by the executing agency based on situations of the target divisions.
[3)] The Project Completion Report said that "open forests changed to dense forests" in 2015. However, there was no explanation on the change of the ratio from open forests to dense forests.

Figure 1 shows further information on forest cover rate changes. The amount of scrub and open forests decreased from the beginning of the project (2006), while the amount of dense forests increased. No target figures had been set for the forest cover rate; it was simply determined whether it had improved. Considering this supplemental information, the forest density improved.



Source: Data provided by the executing agency.

Note: The sum is not 100%, because it excludes lands other than scrub and forest areas such as lakes and urban areas.

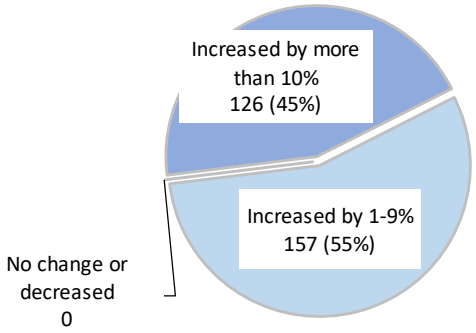
Figure 1. Change in the Forest Cover Rate

[24] The indicator set at the time of appraisal was the "forest and tree cover rate." Forests and trees can be interpreted as the same. The point was the change from scrubs to forests, so the indicator can be described as the "change in the forest cover rate."
[25] Questionnaire response from the executing agency.

(2) Effects of Income Increase

In the project period, wages were paid for work in JFM target areas. There were 42 million days worked (person-days) by the project completion (Indicator 6). In the 125 added VSS, an additional 1.141 million employment days were planned for JFM-related activities[26]. The actual employment, including this added employment, exceeded the target (23.14 million person-days). One possible factor for the increased employment is that more afforestation activities were implemented than planned. Since the project completion, forest protection activities have been implemented on a voluntary basis at each VSS, without payment. The percentage of income increase in 2017 from the previous year per household of beneficiary forest farmers was about 15%, exceeding the target (Indicator 7). Incomes included the household income, including sales of forest products.

As supplemental information, all 283 members of 14 VSS/EDCs answered that their income from sales of NTFPs increased in 2018 compared to the previous year (Figure 2). Among them, 126 increased their income by more than 10% compared to the previous year, and 157 increased their income by 1-9%. The relationship between these increases and the project could not be verified, as the income breakdown could not be confirmed. However, it can be presumed that the project contributed to the income increase to a certain extent.



Source: Answers from 283 members of VSS/EDCs.

Figure 2. Change in Income from NFTP

Table 6. Effects of Income Increase

	Baseline	Target[1)]	Actual			
	2005	2015	2015	2016	2017[2)]	2018
		2 years after completion	Comple-tion year	1 year after completion	2 years after completion	3 years after completion
6) Employment (thousand persons-day)	N/A	22,000 (23,141)	42,000	-	-	-
7) Income increase from the previous year per household of beneficiary forest farmers (%)	N/A	10 (N/A)	Approx. 14	Approx. 15	Approx. 15	Approx. 15

Source: Questionnaire response from the executing agency.

Note: [1)] Upper figures are the sum of the original plan at the time of appraisal and added plan for the extended period.
[2)] At the appraisal time, targets were set for 2015 (2 years after completion). Since the project period was extended, the plan was compared with the achievements in 2017.

[26] According to a JICA internal document, the figure (1.141 million person-days) was calculated by multiplying the added area 10,375 ha by average employment 110 person-days. At the time of appraisal, estimated created employment was 110 person-days per ha. JICA internal document.

The amount of forest products produced after project completion in the target area is shown in Table 7. As mentioned earlier, planting of bamboo, teak, and other trees was conducted more than planned, which led to greater production of forest products than targeted at the appraisal time for two years after the project completion (Indicator 8). Although target figures for the additional outputs during the extended period could not be confirmed, considering the amount of additional VSS (150 added to original 2,275), it is presumed that actual production during the extended period exceeded targets. Furthermore, production continued increasing for three years after the project completion, which probably resulted in income increase for beneficiary forest farmers.

As supplementary information, interviews on production of NTFPs were conducted in 16 VSS/EDCs. Villagers can collect NTFPs freely for self-consumption or sale. Some VSS/EDCs sell NTFPs in groups. Two VSS/EDCs sell NTFPs through intermediary or private companies. Data on production was available only from four VSS/EDCs. Except for one VSS whose data was not available, NTFP production of all VSS/EDCs in 2018 increased from the previous year[27]. According to the interviews, factors for this increase were the annual growing of trees and increases in market prices.

Table 7. Production of Forest Products

	Target[1)]			Actual			
	2013	2014	2015	2015	2016	2017	2018
	Comple-tion year	1 year after completion	2 years after completion	Comple-tion year	1 year after completion	2 years after completion	3 years after completion
8) Production of forest products (thousand Rs./year)	8,500 (N/A)	21,200 (N/A)	430,000 (N/A)	473,000	520,000	572,000	630,000

Source: Questionnaire response from the executing agency.

Note: [1)] Upper figures are the sum of the original plan at the time of appraisal and added plan for the extended period.

3.3.1.2 Qualitative Effects (Other Effects)

JFM was effectively introduced in the project, and as explained earlier, more afforestation was conducted than planned and forest protection activities had been implemented continuously until the time of the ex-post evaluation, which could indicate capacity development among VSS. According to reviewed existing documents and interviewed project stakeholders, the following JFM characteristics of the project contributed to VSS capacity development: (i) support and hand-holding of NGOs; (ii) motivation and capacity building for project management by

[27] Collected forest products include amla, kendu, mahua, sal, siali, harada, mushrooms, herbal plants, and so on. In a VSS that included production data, they generated profits of 3,000 rupees in 2016, 4,000 rupees in 2017, and 8,000 rupees in 2018 by selling sabai, bamboo, mahua, amla, harada, sal, fruits, and so on.

implementation of EPAs; (iii) foundation development for JFM activities, including construction of VSS centers; (iv) formulation procedure for a participatory and transparent micro plan; (v) development of mutual trust with forest personnel; (vi) capacity-building for project management through loans for SHGs; (vii) support from NGOs and Animators[28]; (viii) provision of need-based training; (ix) experience sharing with other VSS; (x) flexible project management of PMU; (xi) a holistic micro-plan that was not limited to forest restoration, and others.

Among the above characteristics of JFM, it was confirmed that utilization of NGOs was a great contributing factor for VSS capacity development in several interviews[29]. This project marked the first experience that the Forest Department received support from NGOs, and allegedly, there were difficulties for both parties at first. PMU proceeded with special attention to making the selection process for NGOs objective and transparent and encouraging forest personnel at the project sites and NGOs work not individually, but as a team to support VSS[30].

Box 1. Role of JICA India Office for Enhancing the Project Effects

JFM was effectively introduced in the project. The survival rate of planted trees and the forest density were improved more than planned, and effects on livelihood improvement were discovered as of the time of the ex-post evaluation. Components of JFM were incorporated into the project plan at the time of the preparatory survey, based on JICA India's data accumulation and analysis, as well as its discussion with the executing agency.

JICA's support of the forestry sector in India began in 1991, and projects formulated until 1997 were classified as "first-generation projects." They primarily focused on forest restoration and included components such as soil and water conservation, training, extension and the procurement of equipment. Although new ODA loan projects were suspended from 1998 to 2003 after the nuclear bomb test conducted by India, JICA India analyzed the first-generation projects in terms of design, implementation, effectiveness and sustainability. Based on this analysis, "second-generation projects" were formulated, and this project was a pioneer project of the second generation, aimed at balancing forest conservation through JFM and livelihood improvement.

Features of the project approach include the introduction of EPAs, the strengthening of VSS functions, the establishment of PMUs, the use of NGO resources and expertise, and the clustering of SHGs, among others. JICA India began a discussion with the Government of Odisha 1-2 years before the preparatory survey and succeeded in formulating a project with the abovementioned characteristics. Also, to ensure that these characteristics were applied in the project implementation, JICA India emphasized the importance and effectiveness of JFM at the semiannual assembly of the Forest Department and at a meeting with top officials of the government of India and Odisha. JICA India tried to convince them the abovementioned characteristics' importance by showing them the

[28] An Animator was selected from each VSS/EDC to (i) facilitate members' participation in project activities, (ii) call and coordinate meetings, (iii) connect the project and VSS/EDC, and (iv) keep VSS/EDC records. Animators were trained on JFM and livelihood improvement to support related activities. During the project period, the project paid each Animator 750 rupees per month.

[29] Interview surveys with the executing agency, project members and consultants.

[30] Interview survey with the executing agency.

results of the implemented projects. In addition to promoting forest restoration and income improvement, this project experience has been reflected in other central government projects and policies as well.

Source: Interview survey results with the executing agency, JICA India office, project consultants, etc.

3.3.2 Impacts

3.3.2.1 Intended Impacts

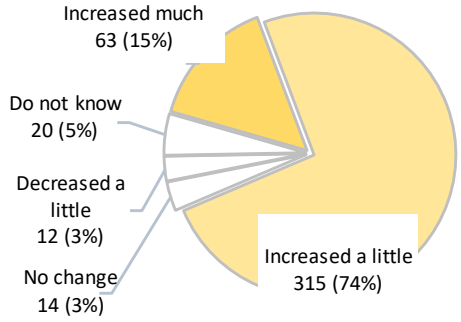
In this project, the following impacts were expected: (1) environmental improvement, (2) living standard improvement, and (3) women's social and economic capacity development.

(1) Environmental Improvement

The water and soil conservation functions of forests include the mitigation of river water depletion and the prevention of sediment runoff, but data for measuring these functions has not been collected. According to interviews at the Divisional Management Units (DMUs) and VSS/EDCs[31], river water depletion and sediment runoff have decreased or at least have not been caused in almost all villages.

(2) Living Standard Improvement

First, livelihood means have been diversified. Before the project, the livelihood means were vegetable cultivation for self-consumption, the collection of NTFPs, the individual selling of vegetables, day labor, and so on. As SHGs began IGAs, livelihood means were increased. Furthermore, many SHGs increased their incomes through the IGAs (Figure 3). Among 424 interviewed members of 70 SHGs, 378 members, or 89% of the total number of interviewees, stated that their incomes "increased much" or "increased a little" in 2018 from the previous year. On the other hand, 12 members experienced decreasing incomes due to decreased harvests stemming from bad weather.



Source: Answers from 424 SHG members.

Figure 3. Change in Income from IGAs

Second, water supply facilities and streetlights were developed, and nonformal education, a medical camp and mosquito net distribution were further provided to drive livelihood

[31] At the ex-post evaluation, interview surveys were conducted with 15 VSS and 70 SHGs in 19 villages from 13 divisions. Information was collected through group interviews from a total of 348 VSS members and 449 SHG members. Following JICA's direction to avoid moving before and after the daylight hours for security reasons and to visit as many divisions as possible during the limited time frame, the Forest Department selected accessible villages in each division.

improvement. As a result, it was reported that the living environment improved. For example, residents experienced easier access to drinking water, an improvement in the rate of well digging, electrification and access to health facilities, among others[32].

(3) Women's Social and Economic Capacity Development

The JFM Resolution of 2005 stipulated that either the chairperson or the sub-chairperson of a VSS should be a woman. It also determined that the general assembly could operate with the participation of more than 30% of its members and that more than 50% of the meeting participants should be women. In accordance with this regulation, women were encouraged to join VSS, and the project incorporated IGAs that mainly women should implement. As a result, in all of the VSS where interviews were conducted, both men and women have participated in forest protection activities. In addition, it is presumed that IGAs have brought not only economic benefits[33] but also women's empowerment. A survey in 2011 that compared four JFM programs of the Odisha State, including the recent project, from the perspective of gender revealed that the project was rated the highest for women's participation in meetings and decision-making[34], which indicates that the project had an impact related to gender.

SHG that expanded vegetable cultivation with drip irrigation. It has a poultry business, too. (Chaka, Keonjar Division)

Interviewed members of SHGs and VSS/EDCs described women's social and economic changes as follows: women are now able to discuss their issues with VSS/EDCs and forest personnel; they leave the house more frequently now; they have more confidence in their actions and words; they now decide how to spend money by themselves; and they better understand the government's programs. It is presumed that these changes are attributed to following several factors; meetings have been regularly set through activities of JFM and IGAs and women have been encouraged to participate in them; they had opportunities to gain a better understanding of their own issues through the present situational analysis for formulating the macro plan or IGA plan; and they have actually implemented the plans they formulated. Women themselves said that they have had chances to talk with forest personnel whom they had never talked with and that they learned how to speak when they listened to other people in the meetings. In addition, their family members appreciate them because they are generating profits from IGAs. They said that they have had support in housework from their family, they have had

[32] Sambodhi (2010) "Mid Term Evaluation of Orrisa Forestry Sector Development."
[33] Interview survey with SHG members.
[34] Behera, Minaketan (2011) "Gender Issues in Joint Forest Management: The Orissa Scenario."

fewer quarrels than before and that they have become able to decide how to spend the money they had earned[35]. Of course, these changes have not been observed uniformly in all of the SHGs. Characteristics of the SHGs in which IGAs have been sustained and expanded more than others include trust among the members as well as interest in business and economic power at the time of forming the group[36]. Literacy in Hindi and good access to the market are comparable benefits. To bridge the differences among SHGs, this project took the approach of learning from other successful IGAs on site by visiting them, in addition to receiving technical training from NGOs.

Box 2. IGAs through Clustered SHGs

In Ghatgaon of Keonjar Division, 23 SHGs have formed a cluster for selling sal plates. They took out a loan of 280,000 rupees from three VSS and also received contributions (500 rupees per contribution) from more than 200 people to establish an enterprise (Sanajiuli Tarini Women Farmers Services Producer Company Ltd.) in 2008. When the cluster was formed in 2008, only 10 SHGs joined it, but as of March 2019, the company has 253 women members from 23 SHGs (of nine VSS). They receive technical training and marketing consultation from the partner NGO that the Forest Department selected.

The company buys 100 sal leaves for two rupees from VSS members. Members of the company make plates by sewing leaves together and receive 0.2 rupees per plate. The company sells 1,000 plates to the intermediary for 400 rupees. In addition, the company pays sewing machine operators 1,000 rupees each per month for their work. Sales for ten months from May 2018 to February 2019 totaled 67,360 rupees.

The company purchased 22 sewing machines after it was established. Five machines are at the center (company office), and the 17 other machines are near the members' residences. Because some members live far from the center, the machines are assigned outside of the center so that members can work near their residences. They used to sell small numbers of plates to nearby retail shops, but currently, the intermediary as a business partner buys the plates in bulk at a fixed price.

When asked how they spent their business profits, one member of the company answered that she built a house with rooms. Another member answered that she bought a pressure cooker, as it would save her time and make her life easier. Furthermore, some members said that through IGAs, they have come to feel empowered because they can now make a decision in business only by themselves with confidence and that they have come to consider themselves capable to earn money.

The Forest Department appreciates this cluster as a successful business model, and some members shared their experiences at the forest sector annual meeting held at the state capital in March 2019.

Plate making by sewing sal leaves together and forming through compression.

[35] Interview survey with SHG members.
[36] Interview surveys with the executing agency and project consultants.

Source: Interview survey results with members of Sanajiuli Tarini Women Farmers Services Producer Company Ltd., and information from the executing agency.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

According to the interviewed executing agency and members of VSS/EDCs, in the 13 divisions where forest fire prevention activities were implemented, the number of forest fire incidents has decreased, or no forest fires have occurred, due to constructed fire lines and regular surveillance. In addition, mangroves were planted, and sand dunes were constructed in wildlife divisions located in the coastal area. These have prevented tidal waves during hurricanes. As explained earlier, the divisions were less damaged than in other areas as a result of the large cyclone that took place in 2013.

At the time of appraisal, there was a concern about the pollution of water and soil due to the use of fertilizers and insecticides in the project, but no such problem has occurred[37]. No negative impact due to the project has been confirmed.

(2) Resettlement and Land Acquisition

No resettlement or land acquisition took place in the project.

(3) Unintended Positive/Negative Impacts

The project experience has been reflected in new policies and programs. First, the state's own afforestation program (*Ama Jangal Yojana*: AJY) (2016-2021) incorporating the project's JFM characteristics has begun. AJY targets 7,000 VSS/EDCs in 30 divisions. The AJY website[38] says that the project experience revealed that forest conservation and livelihood improvement have been further improved due to the support provided in the areas of finances and capacity upgrading, which could indicate a high appreciation of the project. Second, lodges and tourism parks have been constructed based on the project experience related to eco-tourism development, including Chhotkei Nature Camp in Satkosia WL Division (Box 3). Eco-tourism facilities were constructed or rehabilitated in 36 sites with the state government budgets and Odisha Environment Management Fund in 2018. In addition, a website that provides touristic information has been opened; there, lodging information can be searched and booked[39]. Third, the project has had an influence on policies of the government of India. Part of the project

[37] Questionnaire response from the executing agency.
[38] AJY website. <http://www.ofsds.in/ajy.php> (Accessed on May 25th, 2019).
[39] Website of the Odisha Forestry Development Corporation. The Department of Tourism of the Odisha State provides touristic information on the internet, too, but this site focuses on eco-tourism. <https://www.ecotourodisha.com/> (Accessed on June 3rd, 2019.)

approach (reactivation of VSS; training of community foresters [equivalent to Animators]; collaboration with other programs and sectors; use of technologies, including the Global Positioning System mapping; etc.) has been incorporated into the National Mission for A Green India[40]. This was due to that the effectiveness of JICA's projects, including this project, was regularly explained to forest personnel and senior administrators of the national and state government.

Box 3. Impacts of Eco-Tourism Development

Satkosia WL, one of the target divisions, is blessed with diverse flora in two sanctuaries. It is designated as a tiger reserve. It is rich in nature and is inhabited by endangered wild animals, including crocodiles. Because people residing in the reserve and nearby areas faced restrictions in their productive activities and were exposed to possible conflicts with wild animals, eco-tourism development was needed as an alternative livelihood means. In the project, one EDC formed an eco-tourism group (ETG) to begin eco-tourism activities in Chhotkei in Satkosia WL Division. A lodge with five cottages was constructed, and 14 ETG members were trained for about one month to start the business in 2011. After the project's completion, five cottages were added using the budget of the state government. The number of guests slightly increased every year until 2015. In 2015, the lodge had 1,247 guests and a profit of 1,021,872 rupees. In 2016, the number of guests decreased to 571 because the lodge had to be suspended for some time due to active Naxalite activities and tiger attacks; however, the number has been on an increasing trend again since 2017[41]. In the lodge, guests are entertained with local cuisine and local instrumental music at night. In addition, nighttime safari tours occur if the authorities allow them.

The income of the lodge is allocated as follows: 80% goes to lodge expenses, including salaries; 10% goes to the EDC; and 10% goes to the Tiger Reserve Fund. In 2018, the lodge allocated 216,000 rupees to the EDC, among which 100,000 rupees were paid for the repair of photovoltaic fences. The ETG plans to purchase a tin roof for every household of EDC members. (The balance of the Village Forestry Development Fund (VFDF) as of March 2019 is 500,000 rupees.) Thus, the management of the lodge not only helps to conserve the protected area but also contributes to employment creation and livelihood improvement for EDC members.

Reception and dining hall of the lodge.

Source: Interview survey results with members of the ETG (Satkosia Nature Camp) and the executing agency; information came from the executing agency and direct observation (11th and 12th March 2019).

[40] Ministry of Environment and Forests (2012) "National Mission for A Green India."
[41] The number of guests in 2017 was 478 as of December 4th (data accumulated from April to the following March). Before entering the tourism season in December, these data were allegedly more than those of the previous year.

In light of the above, afforestation activities were implemented more than planned, and the survival rate of planted trees and forest cover rate exceeded the target. This has all had forest conservation effects. The production of forest products has also increased, and the effects of income increases have been noted. Furthermore, positive changes, such as income improvement, have occurred as a result of EPAs and the income generation of IGAs. In addition, women's empowerment and political impact at the state and national levels have been confirmed.

Therefore, it can be judged that effectiveness and impacts of the project are high.

[Contributing to Achieving Objectives 15 and 1 of Sustainable Development Goals!]

Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 1 End poverty in all its forms everywhere

Goal 15.2 of SDGs says, "By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally." Meanwhile, Goal 1.4 is "by 2030 ensure that all men and women, particularly the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership, and control over land and other forms of property, inheritance, natural resources, appropriate new technology, and financial services including microfinance."

In the project, participatory afforestation was conducted in areas where people had depended heavily on forest land for living materials, such as fuel and fodder, and income sources. This has contributed to achieving Goal 15.2. In addition, the project has ensured proper access to forest resources for all men and women equally through livelihood improvement activities. Likewise, it has helped women's groups to produce and sell agricultural products with microfinance. This has contributed to achieving Goal 1.4, too.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

The project's executing agency was the Forest Department of the Odisha State. For the project implementation, PMU was established as an independent entity. Since the project completion, the Forest Department has supported VSS/EDC activities for forest management through DMUs and Field Management Units (FMUs). Sections and responsibilities related to forest management and biodiversity management in the Forest Department is shown in Table 8. According to the Forest Department, the number of personnel has been sufficient for performing its duties.

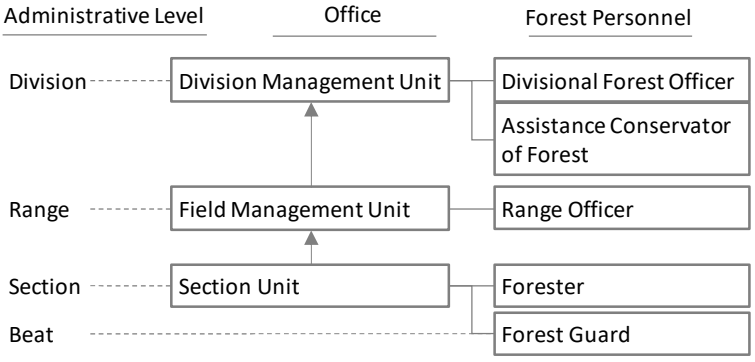
Table 8. Sections related to Forest Conservation and Biodiversity of the Forest Department and number of personnel

Section	No. of personnel	Responsibilities
Territorial Forest Division	11,980	Forest conservation and sustainable management of the forest of the state
Wildlife Forest Division	1,486	Protection and management of biodiversity
Kendu Leave Forest Division	20,350	Collection, processing and disposal of kendu leaves
Working Plan Division	NA	Development of the working plan
Development Circle/ Silviculture Division	264	Training, research on high quality tree species for planting, production

Source: Questionnaire response from the executing agency.

Note: Kendu leaves are used for wrapping tobacco. The Odisha State is one of the national leading states that produces Kendu leaves.

In the target 14 divisions, a Divisional Forest Officer (DFO), Assistant Conservators of Forest, Range Officers, Foresters and Forest Guards have been assigned (Figure 4). A total of 425 Foresters and 881 Forest Guards supervise the areas in charge and support VSS/EDC activities. On the other hand, the area for which a Forest Guard is responsible is large, and he/she needs expertise in biodiversity. The need to increase the number of Forest Guards has been communicated. The shortage of Forest Guards stems from the promotion and retirement of forest personnel, and additional employment has been planned at the division level[42].



Source: Prepared with information from the executing agency by the evaluator.

Figure 4. Forest Administration Level under the Division

Two institutional systems for supporting VSS/EDC activities exist. One is the VSS/EDC forum, which is held monthly at the division level. Representatives of all VSS/EDCs participate in the forum, which a Range Officer chairs. In the forum meetings, the progress of the forest protection activities of each VSS/EDC and the production of forest products is reported. When issues arise at VSS/EDCs, solutions are discussed there, too. In addition, the DFO participates in the forum meetings. The second institutional system is the District Advisory Committee, which the District Chief organizes. VSS/EDCs have conducted activities not only for forest protection but also for livelihood improvement in collaboration with the village assembly. The District Advisory Committee meetings have promoted information sharing and collaboration among

[42] Questionnaire response from the executing agency.

VSS/EDCs and related organizations of the non-forest sector, such as those related to health, livestock and agriculture.

As an organizational structure at the village level, each VSS follows JFM Resolution 2011, which defines the member composition of the VSS Executive Committee. During the project period, an Animator was employed at each VSS/EDC to facilitate the activities. Even since the project completion, though, unpaid Animators have continued their activities in most VSS/EDCs[43]. In all of the 19 visited VSS/EDCs, SHGs have continued their activities. In the last stage of the project period, neighboring SHGs were formed into clusters to expand the scale of IGAs and enhance their sustainability (Box 2). Since the completion of the project, five partner companies and NGOs have supported the production and sales activities of 42 clusters through the Forest Department support (Partnership Eco-system Iinitiatives)[44].

From above, although a shortage of Forest Guards has occurred in some areas, there are some support systems for VSS/EDCs. The organizational structure has been sustained at each VSS following JFM Resolution 2011. Therefore, no problem has been found in the institutional/organizational aspect.

3.4.2 Technical Aspect of Operation and Maintenance

The development circle of the Forest Department has conducted training for forest personnel at the state, division and range levels. Training includes both initial courses and refresher courses. The training covers GIS, forest protection, related laws and regulations, biodiversity management, the survey of wild animals, etc. The training period is one week to one month depending on topics to be covered. The trainers are Forest Department personnel or external lecturers. For newly employed personnel, training sessions are given when they are recruited and assigned to posts. The training aligns with the guidelines of the Forest Department and also with the principles of the Directorate of Forest Education of the Ministry of Environment, Forest and Climate Change of the government of India. The project developed the Micro-Plan Guideline, VSS Management Manual and Project Management Manual, which the Forest Department has referred to. AJY has developed its own guidelines and manuals based on our project's experience. According to the interviewed DMUs, because the guidelines and manuals of AJY and those of the project are similar content-wise, they use the former more than the latter.

The Forest Department has implemented "Odisha Forestry Sector Development Project Phase 2 (OFSDP2)" (2016), which succeeds the project and AJY as its own project, based on

[43] Out of 18 interviewed VSS, the same Animators have sustained their activities in 13 VSS (72%). In four VSS (22%), other members assumed the Animator's responsibilities.

[44] Partner companies include Dabur, a major consumer goods company, and other companies that deal in herbal goods, as well as NGOs in the state. Interview survey with the executing agency.

this project's experience. The Forest Department itself considers that "it has necessary skills for conducting programs, based on the fact that they have not faced technical problems for sustaining forest conservation and biodiversity for the last 10 years[45]."

Regarding VSS, their main activities are related to forest protection (observation of forest conditions and control of illegal logging), with which they have not had technical problems, according to interviewed members. When issues arise, they discuss solutions within the VSS or consult with Forest Guards for solutions. As explained earlier, they sometimes discuss issues and solutions at the VSS/EDC Forum.

In the same manner, when SHGs have problems with implementing IGAs, they discuss solutions within VSS/EDCs. As SHGs have implemented activities that they can handle without support from NGOs, they have not faced any particular problems. They have received no support from NGOs since the project's completion. SHGs have mentioned the need for technical support with marketing and financial management to expand IGAs in the future[46].

From above, at the level of the executing agency, similar JFM projects, such as AJY and the succeeding project, have been implemented. Various training opportunities are provided. In addition, at the VSS/EDC levels, VSS and SHGs have continued forest protection activities and IGAs, respectively, without difficulty. Thus, no technical problems appear to exist.

3.4.3 Financial Aspect of Operation and Maintenance

The Forest Department's budget consists of the project budget and the non-project budget. The project budget is for projects that the national and state governments have planned, and the recurrent non-project budget is for salaries, administration and indirect costs. The forest department's budget slightly decreased between 2015 and 2017 as shown in Table 9, but it increased in 2018. The disbursement ratio was 90%. Even as the programs of the forest department have been expanded, the department itself considers the budget to be sufficient.

Table 9. Budgets of the Forest Department (Million Rs.)

		2015	2016	2017	2018
Project	Planed	20,387	18,093	12,396	22,053
	Disbursed	20,389	15,837	8,255	20,203
Non-Project	Planed	23,040	24,637	30,588	30,599
	Disbursed	21,433	22,793	26,563	26,976
Total	Planed	43,419	42,731	42,984	52,653
	Disbursed	41,822	38,630	34,819	47,179

Source: Data from the executing agency.

[45] Questionnaire response from the executing agency.
[46] Interview survey with SHG members.

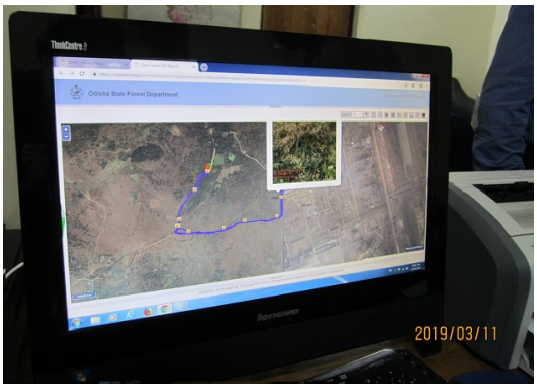
In the project, 100,000 rupees were granted to each VSS/EDC via the VFDF, including the resource funds of loans for SHGs. Amid all of the 19 interviewed VSS, the bank account of the VFDF was sustained. The balance in 2018 varied from 39,000 rupees to 500,000 rupees. The revenues of the VFDF include bank interest, loan repayment from SHGs, membership fees for the VSS/EDCs, fines for illegal logging, rental charges for apparatus owned by VSS/EDCs, and so on. Major expenses include SHG loans. Some VSS/EDCs paid for the construction of fire lines, forest protection activities, the repair of temples constructed as EPAs and scholarships for students in 2018. In addition, some VSS/EDCs have lent money to SHGs that the project did not support so that opportunities could be provided equally to all SHGs[47].

During the project period, SHGs borrowed from VSS/EDCs and opened bank accounts. All 19 interviewed SHGs sustained an account to continue IGAs. The balances varied from 4,000 rupees to 350,000 rupees. Although the SHGs stated that their loan repayments might be delayed when they have less agricultural production or fewer sales, other SHGs repaid their loans without problems. The surplus after-loan repayment from the IGAs' earnings has been distributed among the members or used for investing in the next IGAs[48]. Some SHGs have taken out loans from the bank, in addition to using loans from the VSS/EDCs.

Based on the above, the Forest Department has annually had sufficient budgets for implementing planned programs, and VSS/EDCs and SHGs have implemented their activities with funds that the project granted. Thus, no problem has been confirmed in the financial aspect.

3.4.4 Status of Operation and Maintenance

In monitoring forest conservation, Forest Guards observe forest conditions onsite in their areas. They confirm the forest areas, the implementation statuses of afforestation and soil conservation activities and illegal logging, and they upload data by using smartphones. Uploaded data can be checked from devices at DMUs and FMUs. In addition, changes in the forest cover rate and crown covers are analyzed with satellite images from the Forest Survey of India under the Ministry of Environment, Forest and Climate Change every two years so that they can be made



Monitoring system of forest areas and conditions (DMU of Keonjar)

[47] Interview survey with VSS members. At the time of appraisal, it was expected that after the project completion, VSS would utilize at least 50% of VFDF for forest maintenance and the rest for maintenance of EPAs, village development, and so on.
[48] Interview survey with SHG members.

public[49].

During the extended project period, the VSS micro-plans have been revisited, and post-project activities have been discussed and planned to ensure the sustainability of the activities. Although a revised VSS plan was not developed in a written form (as the VSS's micro-plan was), each VSS has observed forest conditions and controlled illegal logging for the purpose of forest conservation. Few VSS have prepared annual plans since the project's completion, but this has not been a problem because their activities are not complicated. Also, the activities are confirmed at VSS meetings. The reality is, all interviewed VSS have continued their forest protection activities. VSS activities have been conducted with mutual support among members (*tengapali)* without payment. A village assembly meeting takes place in a village that has a VSS, and the village assembly and VSS have duplicate members. Issues related to forest conservation are sometimes raised and discussed at the village assembly meetings among the VSS members[50].

No major problem has been found with the infrastructure that the project developed as of the time of the ex-post evaluation. Each EDC has maintained eco-tourism development sites, such as eco-tourism centers and cottages, community reserves/heritage sites and sacred sites, and the Forest Department has maintained forest roads and link roads. At the visited eco-tourism site in Balasore WL Division, three touristic boats are used at the time of high tide, according to its EDC members. At the tourist center that was visited in the off-season, some of the display cases were dusty, and touristic information was not clear[51]. At the tourism development site in Satkosia WL Division, the lodging facility with 10 cottages has been continuously operated (Box 3). It offers good food service, customer treatment and touristic information related to the nearby area. However, the need for minor repairs was observed in one cottage, as some insect damage was found on the wood door, and holes were found in the mosquito net[52].

From above, the activities of VSS/EDCs and SHGs, as well as forest monitoring by the executing agency have been sustained. Some parts of the eco-tourism sites need to be repaired, but they do not affect their operation. Thus, there has been no major problems has been in terms of operational or maintenance status.

In light of the above, no problem has been observed in the institutional/organizational, technical and financial aspects or the current status of the operation and maintenance system for forest conservation and livelihood improvement activities at the executing agency and VSS/EDCs. Therefore, sustainability of the project effects is high.

---

[49] Website of the Forest Survey of India. <http://www.fsi.nic.in/> (Accessed on May 25th, 2019.)
[50] Questionnaire response from VSS members.
[51] Observation by the visit on March 6th, 2019.
[52] Observation by visit and lodge on March 12th, 2019.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed at restoring degraded forests and improving the income level of villagers by promoting sustainable forest management, including participatory afforestation and community/tribal development in the Odisha State in the eastern part of India, thereby contributing to environmental improvement and poverty alleviation. As this objective was consistent with the development policies and needs of the government of India and Odisha as well as Japan's ODA policy, the project relevance is high. Although the project period was extended for two years, the objective and contents of the added plan were appropriate and additionally intended outputs were produced. Thus, efficiency is high. In the project, afforestation activities were implemented more than planned under the JFM mode, and the survival rate of planted trees and forest density were improved. Also, the production of forest products and incomes of beneficiary forest farmers increased. As a result, gender-related and political impacts were brought about. Therefore, the project effectiveness/impact is high. Regarding sustainability, there have not been major issues in either the executing agency or communities. Thus, sustainability is high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Further Expansion of SHGs' IGAs

Since the project's completion, SHGs have sustained their production and sales activities by themselves, without direct technical support from external organizations such as NGOs. In addition, they have sustained or expanded the scale of IGAs. On the other hand, several SHGs expressed the need for technical support with the marketing and sale of their products at the ex-post evaluation. First, it is recommended to examine their needs through the VSS/EDC Forum and then convey the experiences and know-how accumulated in AJY and OFSDP2 to the SHGs that participated in the project. Concretely, in divisions where AJY is implemented, the Forest Department could invite SHGs to an AJY training, or it could organize a tour to learn from nearby SHGs that have successfully conducted IGAs with support from NGOs, so as to update knowledge and skills.

Second, it might encourage NGOs in the target divisions to apply for the Grant Assistance for Grass-Roots Human Security Projects of the government of Japan, for the capacity building of SHGs. When an NGO applies, it is recommended to let the applicant NGO take advantage of a system for ensuring technical sustainability (cluster of SHGs, training of groups that support SHGs, etc.), not just provide one-time training or consultation.

Further Improvement of the Eco-Tourism Sites

Four years have passed since the project's completion, and the constructed eco-tourism facilities will possibly become obsolete. It is recommended for the DMUs to understand the current situations of the constructed facilities and equipment and provide direction and facilitation to ETGs so that they will develop mid- and long-term plans for repair and reactivation. Based on the plan, it is necessary for ETGs to save the necessary funds.

4.2.2 Recommendations to JICA

It is recommended that the JICA India office provide the Forest Department with necessary information on the scheme and its application procedure, which local NGOs can use for the purpose of the capacity building of SHGs, including the abovementioned Grant Assistance for Grassroots Human Security Projects.

4.3 Lessons Learned

Role of JICA Country Office for Enhancing the Project Effects

The project objectives were achieved, as the survival rate and the forest density were improved, and the effects of income improvement have been also realized. This can be largely attributed to the JFM approach of effectively combining the livelihood improvement component and the reforestation and conservation component, which focused on the capacity development of responsible stakeholders of both components (VSS/EDCs and SHGs). In addition, the JICA India office consistently made effective efforts to design and promote the approach both before and after the project formulation stage (Box 1).

Concretely, the JICA India office not only conducted an impact survey of the past forestry projects but also analyzed the experiences and lessons of the multiple past projects in a certain period. Based on the shared understanding of the approach with the executing agency, JICA conducted the project formulation survey and developed the project plan. During the project implementation and even after the project completion, the JICA India office explained the advantages of the approach to the executing agency in opportunities including the annual forest sector conference or policy consultation for project directors.

In countries where several projects have been implemented in one sector, it is important that the country office does the following to achieve and sustain effects: i) carefully analyze factors for achieving and sustaining effects and examine effective approaches based on the analysis; ii) show the approach's effectiveness with compiled objective data; and iii) fully discuss the approaches with the executing agency at the project formulation stage and design the project plan.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	(1) Restoration of degraded forests 11 Districts (2) Coastal plantation 1) Mangrove plantation 2,100 ha 2) Casuarina plantation 650 ha (3) Biodiversity management 1) Ecotourism development 5 sites 2) Community reserves/heritage sites 5 sites 3) Elephant corridors a) Feed cultivation 650 ha b) Water places 26 sites c) Guide walls 10 km d) Guide trenches 150 km e) Photo-voltaic fences 220 km 4) Training for wild animal rangers 80 persons (4) Community/Tribal development including capacity building of VSS 1) Formation of VSS 2,275 2) Formation of SHGs 4,850 3) Trainees 33,500 persons (5) Supporting activities 1) Establishment of executing body 2) Forest researches 3) GIS/MIS database 4) Infrastructure development a) Construction of forest roads 135 km b) Rehabilitation of forest roads 900 km c) Construction of link roads 115 km d) Rehabilitation of link roads 50 km (6) Consulting services 1) International 44 M/M 2) Local 183 M/M	(1) Restoration of degraded forests As planned (2) Coastal plantation 1) Mangrove plantation 2,769 ha 2) Casuarina plantation 151 ha (3) Biodiversity management 1) Ecotourism development 7 sites 2) Community reserves/heritage sites 2 sites 3) Elephant corridors a) Feed cultivation 0 ha b) Water places 0 site c) Guide walls 0 km d) Guide trenches 0 km e) Photo-voltaic fences 111.87 km 4) Training for wild animal rangers 5 5) Sacred sites 130 sites (4) Community/Tribal development including capacity building of VSS 1) Formation of VSS 2,426 2) Formation of SHGs 7,358 3) Trainees 63,164 persons (5) Supporting activities 1) Establishment of executing body As planned 2) Forest researches 5 3) GIS/MIS database As planned 4) Infrastructure development a) Construction of forest roads 228.54 km b) Rehabilitation of forest roads 433.68 km c) Construction of link roads 126.57 km d) Rehabilitation of link roads 80 km (6) Consulting services 1) International 39.64 M/M 2) Local 261.22 M/M
2. Project Period	April 2006 – March 2013 April 2013 – March 2015 (Extended period) (108 months)	April 2006 – March 2015 (108 months)
3. Project Cost - Amount Paid in Foreign Currency - Amount Paid in Local Currency (In Rupees) - Total - ODA Loan Portion - Exchange rate	 598 million yen 15,831 million yen (N/A) 16,429 million yen 13,937 million yen 1 Indian rupee = 2.49 yen (as of July 2005)	 N/A N/A (N/A) 15,515 million yen 12,126 million yen 1 Indian rupee = 1.96 yen (N/A)
4. Final Disbursement	July 2016	