India

FY2018 Ex-Post Evaluation of Japanese ODA Loan Project

"Swan River Integrated Watershed Management Project"

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0. Summary

This project was implemented with the aim to regenerate the forest, protect the agricultural land, and enhance agricultural and forestry production in the catchment area of the Swan River, in the Una District of Himachal Pradesh (hereinafter referred to as HP) State by carrying out integrated watershed management activities, including afforestation, civil works for soil and river management, soil protection and land reclamation, and livelihood improvement activities, thereby improving the living conditions of people, including the poor, in the catchment area. The objective of the project consisted with the development plan and (development) needs of India, and Japan's ODA policy at the time of the appraisal, therefore, the relevance of the project is high. The expected outputs of the project were produced, while some changes—extending areas of afforestation in public lands and adopting "Panchayat" as an implementation unit instead of "Ward"—had to be made during the project. The project period and cost were within the plan, thus the efficiency is high. Quantitative and qualitative effects were identified through the afforestation, soil protection, and various cultivation technology introduced by the project, as well as the income-generating activities through agriculture. Many residents in the project area recognised improvement of their lives, particularly women's self-help group (hereinafter referred to as SHG) activities that were enhanced by the project, have been developed well, and institutional activities were also established in certain areas. As another positive impact, some leaders of the women's SHGs became resource persons in the other projects. From the those facts, the effectiveness and impact of the project are high. Minor concerns were found in the technical, financial, and operation and maintenance (O&M) components, and, therefore, the sustainability of the project effect is fair.

In light of the above, the evaluation result of this project is highly satisfactory.

1. Project Description

Project Location

Planting Area in Sub-Watershed of Swain River

1.1 Background

In northern and eastern regions of India, damages on agriculture crops and human lives caused by soil erosion and flooding rivers are very serious. Countermeasures for the forest conservation and water management are important issues in terms of protecting limited agriculture farms in hilly and mountain areas[1] in particular. Moreover, before the project was started, the forest cover in India was 23.3% as of 2003, which was lower than that of the world average, 29.6%, in 2003. Around 80% of the poor people living in rural areas in India, depended on forests for feeding for animal husbandry, fuel, and their incomes, and the increasing population in the forest areas gradually placed burden on the forests. As a result, it caused the degradation of the forests and a decline in soil conservation function of the forests as well as putting pressure on the poor people's lives. Consequently, the poor were caught in a vicious circle: the more difficult their lives became, the more dependent they became on the resources of the forests.

The project target area, Swan River watershed[2] in the Una District[3] of HP State, has topographic and geological characteristics of typical hilly and mountain areas in India, and the

[1] They are the areas where there are limited arable fields available and disadvantageous conditions for agriculture. Normally, they are often located between the low lands and the mountains (Source: Ministry of Agriculture, Forestry and Fisheries of Japan HP)

[2] Swan River runs across the northern HP State and Punjab State. The entire length is 85km and the basin area is 1,400 km^2. Out of the 1,400 km^2, an area of 1,200 km^2 runs in the Una District of HP State.

[3] The population of the Una District was approximately 520,000, and its area is 1,540 km^2 (Source: HP State Statistical Abstract 2017–2018)

upriver region of Swan River watershed was one of the worst degraded forests in HP State. Accordingly, sand inflow and soil erosion, damaged agriculture lands and led to frequent flood damages in the Swan River watershed. In these circumstances, the implementation of integrated watershed management of the Swan River watershed was necessary.

1.2 Project Outline

The objective of this project was to regenerate the forest, protect the agricultural land, and enhance agricultural and forestry production in the catchment area of the Swan River, HP State, by carrying out integrated watershed management activities, including afforestation, civil works for soil and river management, soil protection and land reclamation, and livelihood improvement activities, thereby improving the living conditions of people, including the poor, in the catchment area.

<ODA Loan Project>

Loan Approved Amount/ Disbursed Amount	3,493 million yen / 3,449 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	March 2006 / March 2006	
Terms and Conditions	Interest Rate	0.75%
	Repayment Period (Grace Period	40 years 10 years)
	Conditions for Procurement	General Untied
Borrower / Executing Agency	The President of India / Forest Department, Government of Himachal Pradesh	
Project Completion	July 2016	
Target Area	Catchment Area of Swan River in the Una District, Himachal Pradesh State	
Main Contractor (Over 1 billion yen)	-	
Main Consultant (Over 100 million yen)	JAI PRAKASH ASSOCIATES	
Related Studies (Feasibility Studies, etc.)	–JBIC Feasibility Study (1996) –Feasibility Study by Irrigation and Public Health Department, Himachal Pradesh State (2004) –Special Assistance For Project Formulation (SAPROF) for Swan River Flood Management and Integrated Development Project in India (2005) –Additional Study For Afforestation and Flood and Soil-Erosion Control Component, Swan River	

	Integrated Watershed Management Project (2005)
Related Projects	[JICA Technical Cooperation Project] –The Study on Diversified Agriculture For Enhanced Farm Income in the State of Himachal Pradesh (2007–2009) –Project for the Crop Diversification in Himachal Pradesh (2011–2015) –Phase II Project for Crop Diversification in Himachal Pradesh (2016–2021) [ODA Loan Project] –Himachal Pradesh Crop Diversification Promotion Project (February 2011) [World Bank] –Integrated Watershed Development Project (Hills–I)(1990–1999) –Integrated Watershed Development Project (Hills–II)(1999–2005) –Mid-Himalayan Watershed Development Project (2005–2017) [DFID] –Himachal Pradesh Forestry Project (1994–2001) –Himachal Pradesh Forestry Sector Reform Project (2003–2007)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kyoko Harada, Foundation for Advanced Studies on International Development (FASID)

2.2 Duration of Evaluation Study

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

Duration of the Study: October 2018–November 2019

Duration of the Field Study[4]: February 17–March 8, 2019, and May 29–June 9, 2019

2.3 Constraints during the Evaluation Study

There are some operation and effect indicators that have not been recorded since the completion of the project. Those indicators recorded at the time of the project completion were also referred in the ex-post evaluation. At the same time, other alternative indicators were referenced in order to accomplish a comprehensive ex-post evaluation.

[4] During the filed survey, 51 Panchayats (Una: 24, Amb: 13, Gagret: 14) out of 96 targeted Panchayats were inspected. A selection of 51 Panchayats were considered balanced, in relation to the number of the participating Panchayats in each area and topological differences (lower lands located near the river tributaries, highlands alongside mountains, areas between lower lands and highlands, etc.)

3. Results of the Evaluation (Overall Rating A[5])

3.1 Relevance (Rating:③[6])

3.1.1 Consistency with the Development Plan of India

At the time of appraisal(2006), the 10th Five Year Plan (April 2002–March 2007)—the national development plan of India—set four main targets: (i) to fulfil public investment for irrigation and water resource management; (ii) to develop infrastructures, such as irrigations facilities, in the rural areas; (iii) to develop and disseminate agriculture technologies; and (iv) to diversify agriculture crops. For the forest sector, 25% of the Forest Cover was targeted by the end of the *10th Five Year Plan* and 33 % by the end of the following *11th Five Year Plan* (April 2007–March 2012). The *12th Five Year Plan* (April 2012–March 2016) clearly mentioned the forest sector development through the commitments to "Environment and Climate Change" and "Forest and Livelihood".

The government of HP State carried out social forestry under the National Social Forestry Project that commenced in 1985; the movement to Joint Forest Management (hereinafter referred to as JFM) was initiated widely by the order. After the promulgation of the *HP Panchayat*[7] *Raj Act of 1994*, the government of HP endorsed administration authority of the management of natural resources to community groups, including the forest Panchayat institutions.

At the time of the ex-post evaluation, the *Three Years Action Agenda* (April 2017–March 2019) also continuously focused on environment and forest management issues as an important challenges, and it also mentioned the encouragement of communities to participate in forest management.

3.1.2 Consistency with the Development Needs of India

The project site, the Swan River watershed in the Una District of HP State, is located in the southernmost portion of the Himalayan mountain range; covers the Shivalik range, which runs east to west from India to Nepal; and is also located in the flat lands of the Indus River watershed. It is a typical hilly mountain area, and agriculture lands had seriously got damaged by flood and soil erosions during the monsoon season in particular. At the time of the planning stage of this project, the poverty rate of HP State was 19.6%,[8] which was not higher compared to India's entire average of 26.1%. However, the *1999 Human Development Report* by HP State showed the income per capita in the Una District was the second worst among the districts of

[5] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[6] ③: High, ②: Fair, ①: Low
[7] Panchayat is a unit of local administration established by the law of the government of India. Local representatives are selected under the system of Panchayat Raj.
[8] Source: HP State Poverty Survey (1997)

HP State. Moreover, the feasibility study by the Irrigation and Public Health Department of HP State (2004) described the incomes of the project targeted area, which included mountain areas, were lower than those of the flat lands near the Swan River watershed. In the Una District, 63% of the labour population engaged in agriculture, and more than 80% of that population were micro-or small-scale farmers,[9] who had less than 2 hectares of arable fields. In addition, the massive flooding disaster happened near the Swan River watershed in 1989 brought damages to many of the micro- and small-scale farmers. After 1989, sedimentation and soil erosion led to degradations of agriculture lands and forests; as a result, the low capacity of water and soil conservation of the forests triggered another flooding disaster with sedimentation and soil erosion into the river.

3.1.3 Consistency with Japan's ODA Policy

According to the JICA's *Medium-Term Strategy for Overseas Economic Cooperation Operation* at the time of the project appraisal (2006), "Measures for Poverty Reduction" and "Development of Infrastructure for Sustainable Growth" were the main focuses. Japan's *Country Assistance Policy for India* by the Ministry of Foreign Affairs also aimed to achieve "Rural Development Benefiting the Poor". JICA's *Country Assistance Strategy for India (2005)* placed the irrigation and water control sector as its primary sector, and it also included the flood control through watershed integrated development as one of the support targets on the condition that consideration is given to environmental and social impacts as well as irrigation and water control sector. In the forest industry sector, *the Country Assistance Strategy for India* stated that it tried to improve the quality and quantity of the forest by expanding the forest area through the recovery of the degraded forest lands and decreasing sparse wood rate, and that it targeted at areas where poverty was very serious.

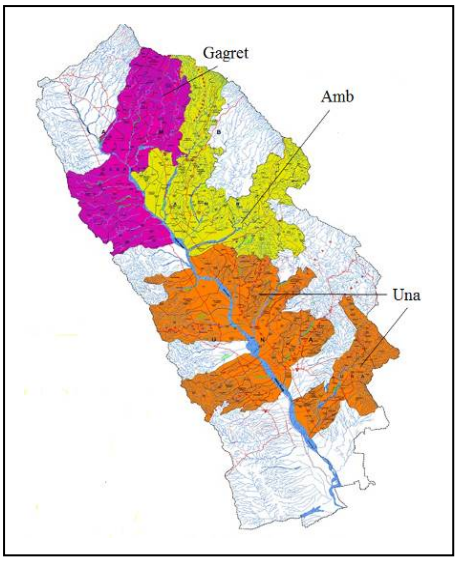

Figure 1: Target areas in Una District

3.1.4 Appropriateness of the Project Plan and Approach

The following three changes have been made since the commencement of the project.

[9] It is defined that farmers who own less than one hectare of land are microscale farmers, and farmers who own more than one hectare, but less than two hectares of land are small-scale farmers (Source: Ministry of Agriculture and Farmers Welfare of India)

First, the Ward Development Committee (WDC) was the initial existing administrative units, and "Ward" was applied as a unit of each activity for the project; however, the Panchayat Development Committee (PDC), which was a higher administrative authority than the WDC, was applied as a unit of activity for the project instead of the WDC because of the following reasons: Panchayat makes the boundaries for the land-use right clearer than Ward in terms of natural resource management; if any conflicts against natural resources occurs, the reconciliation procedure for Panchayat is easier; and it is also easier to elect the representative in Panchayat. Due to this change, the project eventually decided 96 Panchayats[10] as the target areas, consisting of three project implementation units (PIU) of Una, Amb, and Gagret, which covered 22 sub-watersheds of the 42 sub-watersheds in the total catchment area of Swan River.

The second change was to modify the targeted areas for afforestation both in the government lands and private lands as shown in table 1.

As soon as the project was started, a participatory rural appraisal was carried out in order to reflect the communities' needs for the project and to design the micro-plan (activity plan)[11] that indicated each component's activity at the Panchayat level (To be described in the following Box1). During the process of designing the micro-plan with the communities, the project was re-estimated for the available afforestation lands, and communities' needs were examined, and finally the original target areas were changed. Besides, the government forests managed by JFM were decreased substantially because the Forest Department (hereinafter referred to as FD) intervened in the same area with other ongoing forest conservation projects at the same time.

Table 1: The Change of Target Areas for Afforestation

Type of Forest	Target areas at the appraisal (ha)	After modification (ha)
Government forests (by FD)	2,000	2,000
Government forests (by JFM)	6,000	2,720
Private forests	1,700	4,150
Forests for soil protection works	4,000	3,630

Source: Documents provided by JICA

The reason that targeted private forests were largely extended is that holistic treatments of the catchment areas was required, while mosaic set ups of private forests and government

[10] At the time of appraisal, 60 Panchayats was targeted; however, it was increased to 96 Panchayats after the micro-planning (to be described later) process at each Panchayat. The 96 Panchayats consisted of 50 PIU in Una, 24 PIU in Amb, and 22 PIU in Gagret. They were selected on the basis of the criteria: (i) areas with soil erosion intensity, (ii) areas of open and degraded forests, (iii) poverty status, and (iv) the community's willingness to participate.

[11] Micro-planning is a way to motivate people of the community to participate in a project through discussions regarding the project activities and to decide specific action plans (micro-plans). It is also aimed to grow the ownership of the project while sharing the process, as well as finding their needs.

forests were considered to be obstacles for integrated watershed management. It was recognised that private forests would need more intervention in order to increase the forests in the catchments areas.

Third, the target areas of soil protection and land reclamation components were also reduced as a result of micro-planning as shown in table 2.

Table 2: The Change of Target Areas for Soil Protection and Land Reclamation

	Target areas at the appraisal (ha)	After modification (ha)
Soil Protection (Terrace, Wooden Mattress, and Earthen Wall)	5,100	2,550
Land Reclamation (Ground Levelling, Soil Dressing and Irrigation System)		

Source: Documents provided by JICA

According to the interviews with the officers of FD, these changes were agreed among communities through the micro-planning process and approved by the related line departments through the appropriate procedures. Changing the units from the WDC to the PDC and changing target areas for afforestation were rather effective because these changes reflected the actual needs and statuses of the communities.

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

Box 1: The micro-planning promoted participation of the communities

Each component of the project, such as afforestation, agriculture, soil protection, improving livelihoods, and constructing small community infrastructures was discussed and planned by local residents including Panchayat development members, existing user group (UG)[12], and self-help groups (SHG), for six to nine months.

The community path and foot bridge in front of a school that was constructed in accordance with the micro-plan.

Through the interviews with the beneficiaries at the time of the ex-post evaluation, it was recognised that the planning process motivated community members to participate in the project and brought high satisfaction toward the project. Additionally, changing the unit from the WDC to the PDC was effective in order to produce positive outcomes because PDC was the unit more familiar to the residents including the existing election systems, and, therefore, it provided a clear awareness that this project was based on the community's efforts.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

The project implemented afforestation, civil works for soil and water management, soil protection and land reclamation, and livelihood improvement as the outputs. The planned outputs and actual outputs are shown in Table3.

Although there are some modifications, they were mostly implemented as planned.

Table 3: Planned and Actual Outputs of the Project

Plan[13] (2006 at the time of appraisal)		Actual (2016 at the time of project completion)	
Afforestation			
-Renovation and Strengthening of Nurseries	7	-Renovation and Strengthening of Nurseries	10
-Afforestation of Government Land by Government	2,000 ha	-Afforestation of Government Land by Government	2,000 ha
-Afforestation of Government Forests by JFM	2,720 ha	-Afforestation of Government Forests by JFM	2,720 ha
- Afforestation of Private Land	4,150 ha	- Afforestation of Private Land	4,151 ha

[12] User groups include the water management group, production group, planting group, and fishery group.
[13] The targets of afforestation shown are revised targets.

-Soil Protection Works in Government Forests (Terrace, Wooden Mattress, and Earthen Wall)	3,630 ha	- Soil Protection Works in Government Forests (Terrace, Wooden Mattress, and Earthen Wall)	3,585 ha
Civil Works for Soil and Water Management			
-Check Dams		-Check Dams	
-Small Scale and Brushwood Check Dams	Approx. 3,280	-Small Scale and Brushwood Check Dams	19,328
-Large Scale Check Dams (around 10m)	Approx. 50	-Large Scale Check Dams (around 10m)	738
-Spur and Embankment	Approx.14 km	-Spur and Embankment	8.5 km
-Ground Sill	Approx. 60	-Ground Sill	296
-Riverbed Excavation	400,000 m^3	-Riverbed Excavation	0 m^3
Soil Protection and Land Reclamation			
-Soil Protection Works (Terrace, Wooden Mattress and Earthen Wall) -Land Reclamation (Ground Levelling, Soil Dressing and Irrigation System)	2,550 ha	-Soil Protection Works (Terrace, Wooden Mattress and Earthen Wall) -Land Reclamation (Ground Levelling, Soil Dressing and Irrigation System)	2,550 ha
Livelihood Improvement (No quantitative indicators set)			
-Production Activities (Demonstrations related to Horticulture, Animal Husbandry, and Agriculture; Grass Land Development; Demonstrations related to Energy-saving Equipment including Biogas Generators; Government-operated Agriculture and Animal Husbandry Facilities Development; Village Ponds Construction; and Irrigation Facility Constriction)		Demonstrations farm for Horticulture 650 locations Horticulture farms 253,949 ha Mangers 10,864 Caw sheds 4,041 Chaff cutter 6,184	
-Small Scale Infrastructures (Entry point activities in order to motivate the community member's participation: it was decided in accordance with the discussion of the micro-planning. Community Paths, Reservoirs, School and Temple renovations, etc.)		Village paths 97.67 km Roof rain water harvesting 694 Footbridges 75 Village ponds 53	
-Income-Generating Activities, such as Processing Non-Timber Forest Products and Apiculture, etc. by micro-credit.		Production, processing and selling spices, making pickles and dry fruits, packaging and selling soaps, etc.	
Institutional Building			
-Purchase of computers, cars and related devices -Office renovation -Establishment of GIS system and weather stations -Employment of staff for Project Implementation Unit (PIU) -Employment of extension workers for communities -Facilitators, etc. -Training for government officials, extension		Purchase of computers, cars and related devices -Office renovation -Establishment of GIS system and weather stations -Employment of staff for Project Implementation Unit (PIU) -Employment of extension workers for communities -Facilitators, etc. PIU staff 49	

workers and beneficiaries -Awareness-raising campaigns for the environment	Extension workers for community Facilitators 15 Group organisers 40 Agriculture 7 Horticulture 3 Veterinary 2 Para workers 71 -Trainings for the government officials, extension workers and beneficiaries -Agriculture and production technology (Onions and turmeric etc.) -Animal husbandry: dairy management. Poultry, Bee keeping -Horticulture: Orchard and flowers growing -Income generation: Bamboo products (by NGO) -Agroforestry -Awareness Campaign Veterinary awareness Environment -Exposure visits Within/Outside state and training in Japan
Consulting Services	
-Preparatory survey for selecting the target area -Detailed survey, detailed design, and bidding assistance for civil work -Monitoring of the project -Technical guidance -Summarizing the experience and lessons learned in this project	-Preparatory survey for selecting the target area -Detailed survey, detailed design, and bidding assistance for civil work -Monitoring of the project -Technical guidance -Summarizing the experience and lessons learned in this project

At the Civil Works for Soil and Water Management component, the number of spurs and embankments are less than the plan. It was reduced during the project because the Irrigation and Public Health Department (IPH) decided to implement the construction of spurs and embankments as a separate project at the seven prioritised sub-watershed areas where, through the micro-planning, it was identified that urgent treatments were necessary. Consequently, the intervention by this project on the construction of spurs and embankment was decreased. Similarly, riverbed excavation was not implemented because this project focused on watershed management[14] rather than river management, and IPH decided to carry out another river management project other than this project. On the other hand, check-dams were constructed about six times more than that of the plan for the same component.

[14] Watershed management is practices and technologies that improve water circulations in the entire watershed. (Source: National Institute of Environmental Study http://tebou.nies.go.jp/)

Afforestation (Agroforestry)

Check-Dam

Embankment (Soil Protection)

Water Pump

Sprinkler in the field

Manger

There were a variety of activities developed in the Livelihood Improvement Component with the support of the Agriculture Department, Horticulture Department, Animal Husbandry Department, and Fishery Department.[15] Activities, such as technical transfers, different kinds of training, and setup of demonstration farms, led the livelihood improvements of the communities. Furthermore, small-sized community infrastructures (e.g., paths, village ponds, footbridges, etc.) were also constructed through the micro-planning under the Livelihood Improvement Component.

For institutional buildings, the training was implemented not only for the community members but also for the government officers. Although there is no specific information about the job titles of the officers who joined the training, approximately 300 training courses, such as “community formation”, “income generation”, and JFM, were conducted.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual total project cost was 4,113 million yen (including the 3,493 million yen of the Japanese ODA Loan), while the planned total cost was 4,153 million yen (including the 3,493 million yen of the Japanese ODA Loan). Therefore, the project cost was within the plan (99% of the plan).

[15] At the time of planning, IPH was included as a member department of the project; however, because the project decided to focus more on the watershed management than the river management, IPH did not participate in the project at the end. (Source: Documents provided by JICA)

Table 4: Comparison of Plan and Actual of Related Project Expenses (Unit: million yen)

Items	Plan (2006)						Actual (2016)					
	Local Currency		Japanese Yen		Total		Local Currency		Japanese Yen		Total	
	Total	ODA	Total	ODA	Total	ODA	Total	ODA	Total	ODA	Total	ODA
Afforestation	0	0	799	799	799	799	484	484	347	347	831	831
Civil Works for Soil and Water Management	0	0	896	896	896	896	841	841	632	632	1,473	1,473
Soil Protection and Land Reclamation	0	0	199	199	199	199	117	117	75	75	192	192
Livelihood Improvement	0	0	393	393	393	393	259	259	183	183	442	442
Institutional Building	0	0	535	535	535	535	162	162	142	142	304	304
Price Escalation	0	0	142	142	142	142	0	0	0	0	0	0
Physical Contingency	0	0	153	153	153	153	0	0	0	0	0	0
Consulting Services	141	141	127	127	268	268	76	76	67	67	143	143
Administration Cost	0	0	336	0	336	0	218	0	194	0	412	0
Tax and Duties	0	0	324	0	324	0	117	0	91	0	208	0
Interest during Construction	108	108	0	0	108	108	0	0	108	0	108	108
Total	249	249	3,904	3,244	4,153	3,493	2,274	1,939	1,839	1,446	4,113	3,493

Source: Documents provided by JICA

*Note1: As of planning, the currency exchange rate was 1 rupee = 2.49 Japanese yen (July 2005). Rate of price escalation: local currency 1.3%, Japanese yen 1.0%, physical contingency 5% of the whole project cost

*Note2: Currency exchange rate (actual) was 1 rupee = 1.70 Japanese yen (March 2014)

3.2.2.2 Project Period

At the time of the appraisal, the project period was set as 96 months, from March 2006 (L/A signing) to March 2014, when the loan was completed. After the official discussions between the Indian government and JICA, it was agreed that the project period and the consulting service would be extended until March 2016 on the condition of the detailed action plan submission. For further extension of the project period, the agreement[16]was stipulated that this project should be completed by the end of the loan completion in July 2016. Hence, it can be concluded that the project period was within the plan.

[16] The minutes of the meeting were made by the Ministry of Finance of India, the government of HP and JICA on 8 March 2014.

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

According to the appraisal records, the assumed costs were the project cost (excluding tax) and the operation and maintenance costs. The assumed benefits were the benefits from afforestation, agriculture, horticulture, animal husbandry, and livelihood improvement. Under these assumptions, the Financial Internal Rate of Return (FIRR) was 13.1% within 40 years of project life. FIRR was re-calculated to be 12.2% based on the available data and information at the time of the ex-post evaluation.

Likewise, the Economic Internal Rate of Return (EIRR) at the time of the appraisal was calculated under the same assumed costs and project life as FIRR, while the effects by soil protection and prevention of forest fire were added to the assumed benefits of FIRR. Under such conditions EIRR at the time of appraisal was calculated to be 15.3%. At the time of the ex-post evaluation, EIRR was also re-calculated to be 13.2%. Both FIRR and EIRR were decreased compared to the time of appraisal. It was because incomes from horticulture, animal husbandry, and apiculture were relatively lower than expected.

As stated, both the project cost and project period were within the plan. Therefore, the efficiency of the project is high.

3.3 Effectiveness and Impacts[17] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

The planned and actual operation indicators set at the time of the appraisal are shown in Table 5.

(1) Afforestation

As for the afforestation, the actual plantation area far exceeded the target area, while the number of planted trees was lower than the target.

While the number of planted trees was estimated to be 1,500 per hectare at the time of the appraisal, the actual number of planted trees resulted in 700 per hectare, referring to the planting model under the government of HP State during the project. Another reason that the number of planted trees was decreased is due to the agroforestry,[18] which was implemented in 3,500 ha of the lands, and it required certain spaces between the trees for agriculture. As for the number of complementary trees, it was targeted at 40% of the number of the planted trees, and the actual number of complementary trees exceeded 40% of that in 2017.

[17] Sub-rating for effectiveness is to be put with the consideration of impacts.

[18] Agroforestry is agriculture in the trees. There are advantages for promoting reforestation, biodiversity, and income generation through crop diversification. (Source: Ministry of Environment of Japan and NGO Hands)

Table 5: Afforestation Related Indicators

Indicator	Baseline 2004	Target *Note 1 2018	Actual 2016	Actual 2017	Actual 2018
		2 Years After Completion	Completion	1 Year After Completion	2 Years After Completion
Afforestation Area	-	9,700 ha	-	12,456 ha	12,456ha
Number of Planted Trees	-	14.9 million	-	5.6 million	N/A
Number of Complementary Trees	-	6 million	-	2.6 million	N/A
Forest Cover[19] (Tree Crown)	Degraded Forest (Less than 10%) Open Forest (10–40%)	Degrade→Open Open→Dense (More than 40%)	-	Degrade→ Open	Degrade→ Open
Amount of Product Volume in Monetary Value	-	20 million rupees/year	-	20 million rupees/year	N/A

Source: Documents provided by JICA, Forest Department questionnaire and interviews
*Note1: At the time of the appraisal, the target year was set to be 2016 (2 years after the completion). However, due to the extension of the project period, the target year was changed to 2018 for comparison. Hereinafter, the same applied to all the operation and effect indicators. The indicators that have no actual records from 2018 were compared with the records from 2017.

The target survival rate of the planted trees at the time of the appraisal was calculated based on previous experience by the FD (Table 6). At the time of the ex-post evaluation, the planted trees were monitored and recalculated by the FD for the afforestation area, including the areas that trees were planted more than 5 years ago, resulting in a survival average of 45%. According to the interview with an officer of the FD, it was caused by serious forest fires and drought from significant rises in temperature in the dry season due to recent climate change. FD recently conducted awareness campaigns against forest fire with the communities.

Table 6: Survival Rate of Trees

Indicator	Baseline 2004	Target (At the Fifth Year*Note1) 2018	Completion 2017	Ex-Post Evaluation*Note2 2019
Survival Rate of Trees	-	60%	60%	45%

Source: Documents provided by JICA, Forest Department questionnaire and interviews
*Note 1: The target was set for the survival rate after the fifth year of planting.
*Note2: The survival rate at the time of the ex-post evaluation (May 2019) is the average survival rate from the time of planting to the time of the ex-post evaluation.

[19] Forest Cover is classified in terms of tree canopy (the upper part of the tree where the leaves are covered) and are density as Very Dense Forest (Tree canopy density of 70% or above), Moderate Dense (Tree canopy density of 40% to 70%), and Open Forest (Tree canopy density of 10% to 40%). (Source: Forest Survey of India)

Regarding the improvement of the quality of forest, it was expected that the degraded forest, which is the worst condition among the criteria to measure the quality of forests, would change to open forests, and the open forest would change to dense forest. Although there is no record with detailed information about the quality of forest in the target areas, changes in the forest areas in the whole Una District shows that it has been slightly improved year by year, as shown in Table 7.

Table 7: Change of Forest Type and Forest Areas in the Una District (Reference)

Unit: km^2

Type of Forest	2005	2009	2011	2013	2015	2017
Open Forest	355	205	203	203	203	234
Moderately Dense Forest	158	298	302	302	302	303
Dense Forest	5	18	18	18	18	19
Total	518	521	523	523	523	556
As a percentage of the entire Una District*Note1	33.6%	33.8%	33.9%	33.9%	33.9%	36.1%
As a percentage of the entire Swan River catchment area*Note2 in Una District	43.0%	43.2%	43.4%	43.4%	43.4%	46.2%

*Note 1: Area of Una District 1,540 km^2

*Note 2: Swan River catchment area in Una District 1,204 km^2

Source: Forest Survey of India, documents provided by JICA and Statistical Abstract of Himachal Pradesh 2017–2018

(2) Group formation in the communities

At the planning, it was expected that some of the government land would be managed by JFM. However, establishments of the new JFM or PDC were not actively developed since Panchayat, the existing administrative unit, became the unit of this project. On the contrary, various production activities, such as agriculture, horticulture, fishery, and handy craft production, were introduced by the livelihood improvement component and developed as SHGs in each area.

Table 8: Indicators related to group formations

Indicator	Baseline	Target	Actual		
	2004	2018	2016	2017	2018
		2 Years After Completion	Completion	1 Year After Completion	2 Year After Completion
Number of Established Panchayat Development Committee (PDC)	-	300 (150 JFM, 150 Non-JFM)	96 Non-JFM	96 Non-JFM	-
Number of Established User Groups (UG)*Note1	-	900	238	900	-
Number of Established Self-Help Group (SHG)			633		

*Note1: User group includes water management group, production group, planting group, fishery group, etc.

Source: Documents provided by JICA and Forest Department Questionnaire

SHGs was one of the most enhanced activities during the project. There were many different types of activities, such as turmeric production and processing, soap packaging, pickling, and dry fruit production. Women's SHGs were particularly developed, and it was identified during the ex-post evaluation that women in the target area began participating in other activities in the community, as well as became confident in themselves by gaining their own incomes (See also 3.3.2.2 (3) Women's empowerment).

(3) Agriculture

As for indicators related to agriculture, increases in the amount of productions and yields of the major cereal crops were expected. The project also expected to increase farmers' incomes by increasing the productions and yields of the crops. At the time of the appraisal, hose agriculture indicators were set not only for the project area but for the entire Una District.

Table 9: Indicators related to agriculture

Indicator	Baseline	Target	Actual		
	2004	2018	2016	2017	2018
		2 Years After Completion	Completion	1 Year After Completion	2 Years After Completion
Production Volume of Major Crops (MT/annual)	Maize 72,900 Rice 12,000 Wheat 49,600 Barley 2,800 Veg. 73,100	Maize 94,900 Rice 14,000 Wheat 59,520 Barley 3,220 Veg. 91,375	Maize 55,029 Rice 4,558 Wheat 77,621 Barley 0 Veg. N/A	Maize 73,994 Rice 4,474 Wheat 79,175 Barley 0 Veg. N/A	Maize 67,141 Rice 4,548 Wheat 66,952 Barley 0 Veg. N/A
Yield of Major Crops per Unit Area (MT/ha)	Maize 2.44 Rice 1.48 Wheat 1.36 Barley 1.16 Veg. 16.50	Maize 2.94 Rice 1.78 Wheat 1.63 Barley 1.39 Veg. 20.60	Maize 1.76 Rice 2.70 Wheat 2.19 Barley 0 Veg. N/A	Maize 2.40 Rice 2.87 Wheat 2.24 Barley 0 Veg. N/A	Maize 2.24 Rice 2.84 Wheat 2.27 Barley 0 Veg. N/A
Gross Annual Average Farm and Forest Income (rupees/household)	40,000	60,000	N/A	60,000	62,000

Source: Documents provided by JICA, Forest Department Questionnaire and Agriculture Department

The results of the agriculture-related indicators at the time of the ex-post evaluation shown in Table 9. As for the production volume, wheat exceeded remarkably while those of maize and rice were lower than the target. For the yield, rice and wheat improved significantly; the productivities improved.

Additionally, the targeted production volume of rice, which had a large gap between the target and actual, was set with a baseline of the actual production volume in 2004.[20] Nevertheless, before 2004, the annual rice production was between 4,000 tons and 8,000 tons, and the rice production in 2004 had a relatively large quantity compared to previous years (Table 10).

In this point of view, the actual production volume of rice in recent years should not be deemed lower; rather, the target was considered to too ambitious. According to the interview with the Agriculture Department, some farmers shifted to produce other crops that require less water than rice production and grow easily because of the decrease in the current groundwater levels.

Table 10: Rice Production in the Una District before the Project

	2000	2001	2002	2003	2004	2005	2006
Production (MT)	5,400	7,800	4,200	4,630	12,000	3,953	4,464

Source: Documents provided by JICA, Directorate of Land Records and Agriculture Department

(4) Soil Erosion

The target of the land area with a reduction in soil erosion and flood damage was achieved. The length of tributaries protected from erosion was achieved at 60% of the target. Indeed, as for activities to reduce soil erosion and flood damage, some areas were not actively participating in the project[21] since the landowners lacked interest in the management of their private lands, which affected to secure the land for the activities.

Table 11: Indicators Related to Soil Erosion

Indicator	Baseline	Target	Actual		
	2004	2018	2016	2017	2018
		2 Years After Completion	Completion	1 Year After Completion	2 Years After Completion
Land Area with Reduction in Soil Erosion Land Area with Reduction in Flood Damage	-	5,100 ha	N/A	5,100 ha	-
Length of Tributaries Protected from Erosion	-	14,100 m	N/A	8,500 m	-

Source: Documents provided by JICA and Forest Department Questionnaire

[20] Source: The document provided by JICA
[21] Interviews with Forest Officers

3.3.1.2 Qualitative Effects (Other Effects)

(1) Improvement in quality of forest and soil and water conservation

Improving the qualities of forest and soil and water conservation were expected as qualitative effects at the time of the appraisal. As for the quality of forest, moderately dense and dense forests were increased in the whole Una District, as shown in Table 7 (P 13). Hence, it is judged that the forest quality is improving constantly.

Regarding the soil and water conservation, many people living in the flat lands near the tributary of the Swan River in the Una and Amb Area recognised an increase of groundwater levels, as well as improvements of the daily water supplies for their lives and agriculture. Likely, some farmers in the same areas mentioned that water supplies through the irrigation systems increased and extended their agriculture lands. On the contrary, few residents identified any improvement of the water status of agriculture lands compared to before and after the project in Gagret, which is located in a hilly and mountainous region.

3.3.2 Impacts

3.3.2.1 Intended Impacts

(1) Income Source Diversification and Income Generation

In the income generation component, other than the FD, which was the main executing agency, the Agriculture Department, Horticulture Department, Animal Husbandry Department, and Fishery Department also participated in conducting various kinds of training for the communities.

At the time of the ex-post evaluation, improvements in agriculture were widely recognised by the residents.[22]

Table 12: The Acreages and Productions of Onion, Turmeric and Potato in the Una District

		2013	2014	2015	2016	2017
Onion	Area (ha)	220	225	216	195	220
	Production (MT)	3,445	3,567	3,419	3,275	3,715
Turmeric	Area (ha)	30	40	28	40	46
	Production (MT)	300	438	280	475	546
Potato	Area (ha)	1,022	770	1,000	600	980
	Production (MT)	11,810	8,350	12,500	14,400	11,760

Source: Agriculture Department

[22] The interviews were conducted with 120 people (50 men and 70 women) in the communities (including group interviews). Interviews targeted leaders of PDCs, leaders and members of women's SHGs, leaders and members of user groups, and community members (mainly farmers).

Most people in the target area are engaged in agriculture. The facilities provided by the project, such as small irrigation facilities, village ponds, and water harvesting structures, increased water supply to the agriculture lands. Furthermore, the quality of seeds, efficient cropping cycles, and new cropping technologies that were introduced and taught by the project promoted crop variety, as well as increased productions of turmeric, coriander, potato, kharif onion, etc. (Table 12).

Table 13: Major Training Courses for the Communities and the Number of the Participants

Topic	Content	The number of the participant *Note
Agriculture	Production techniques (onion, turmeric, potato, etc.)	6,768
Animal Husbandry	Dairy management, backyard poultry, and apiculture	679
Horticulture	Horticulture management techniques of various fruit plants; floriculture	1,059
Agroforestry	Agroforestry	235
Awareness campaign	Veterinary awareness campaign	21,230

*Note: The total number of participants from 2006–2016
Source: Documents provided by JICA

One of the reasons for this improvement is capacity development of the residents through the different types of training courses in the project (Table 13). These courses promoted SHG's activities and women's social activities as well.

Livestock is an issue with the high interest among the communities. Dairy cattle are valuable assets because they produce milk to sell and can be exchanged for cash. During the project, some women purchased cows with the income they had earned in the income generating activities and launched milk businesses. People were keen about the livestock issues, and the practical training provided by the project related to livestock, such as sanitation for the cowsheds, vaccinations, and feedings, had good reputations among the participants.

During the horticulture training, growing techniques for citrus orchards and mangos were introduced; however, productions were not large among the farmers in the target area at the ex-post evaluation due to the decreased market prices.

The Fishery Department introduced fish farming in the village ponds and reservoirs and assisted fishery groups to sell fish for income generation. Yet, active SHGs for fishery were hardly recognised at the time of the ex-post evaluation. There were only communities[23] in which people grow fish for their own consumption purposes.

[23] Fishery activities were implemented at 41 locations (Source: Documents provided by FD)

Apiculture by SHGs was expected to develop at the time of planning; however, it was not developed because there was another project implemented by the HP State government at the same time.

(2) Improvement of living conditions

Community infrastructures, such as footbridges and paths, were constructed to motivate the community's entry into the project and have contribute to improving the living conditions of the residents.

Bridge constructed across the river that used to swell with water during the monsoon season

Concrete footpath in the community

In Nangal Slangri in the Una Area, students used to face difficulties going to a school located at the other side of the river when the river swelled and became hard to cross with the heavy rains in monsoon season. According to the interview with the community residents, the bridge made it easy to go to school. In Tatera and Oel Areas in Gagret, the footpath encouraged people to go out and visit one another. At the same time, it made cars and tractors easy to drive within the community. At Chalola in the Una Area, the internal exchanges of the community and women's activities became more active since the footpaths and bridges were constructed. After the PDC members of Chalola were inspired by the outcomes of the project, they applied for a government subsidy in order to renovate existing paths by themselves. At Ambota in the Gagret Area and Amb Tilla in the Amb Area, both located in hilly and mountainous areas, the pumping water systems of the project brought water from reservoirs in the low lands to the high lands, where there were residential areas, and it improved the water supply for daily life and the agriculture lands for individual consumption. Women who used to fetch water at the water source, which was located far from the residential areas, said that it shortened their times for taking water because the water tank became available near their houses.

(3) Improvement of nutrition standards

Through the interviews with communities, it was confirmed that the technologies and seeds for new crops introduced by the project promoted an increase in the variety of crop production, and accordingly, it increased a variety of crops for self-consumption.

The Swan Women's Federation (hereinafter referred to as SWF and is described later), which was initiated and formed by the project, is working towards free soup kitchen services for people in need. It contributes to improving the nutrition standards of the whole community.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the natural environment

At the time of the appraisal, it was planned that the target areas would not include any natural reserves or surrounding areas, and also the project would plant indigenous trees, thus, the negative impacts against the environment could be minimised. In the context of India's domestic laws, the project was not subject to Environmental Impact Assessments (EIA) and no EIA reports were provided.

At the time of the ex-post evaluation, there was no negative impact on the natural environment identified through the monitoring records by the FD, other related official reports, or the interviews with the people in the communities.

(2) Resettlement and land acquisition

The project was implemented at the selected government forests and private forests after discussions and agreements with residents regarding participation; therefore, no resettlements or land acquisitions were conducted.

(3) Women's empowerment

As mentioned in the previous sections, the project's support for women's SHG activities contributed to empowering women in the target Area. In the Gagret Area, through the interviews, three women's SHGs, which manage funds by collecting of 20 rupees from the members monthly, were identified. They saved the money in the bank, and the interests will be shared among the members after five years.

In the Una Area, which was the largest area and had the largest number of Panchayats among the three PIUs, while women's SHG became increasingly active during the project, SWF was established. At the time of the ex-post evaluation, it had expanded its activities. SWF is a membership-based organization with approximately 10,000 members at the time of the ex-post evaluation. Major activities are production, processing, and selling of spices such as turmeric; providing good quality seeds; providing financial services including loans and savings for SHGs; and providing welfare services (blanket rental for the members, provision of scholarships,

support for wedding expenditures, and provision of foods), which covers a wide range of activities.

Through the interview with the SWF leaders,[24] the leaders recognised the changes in the women, such as each member obtaining confidence through the SHGs activities and finding counsellors when they had any problems to discuss. The SWF management also explained that the leaders encouraged women to join in the SHGs while listening to their problems as counsellors. Moreover, through these leader's activities, they enhanced a sense of presence in the communities.

The leaders of the SWF are also playing an important role as a facilitator in "Technical Cooperation Project for Crop Diversification in Himachal Pradesh" (hereinafter referred to as CDHP). The human resources, which were developed by this project, are being utilised in other projects and other synergetic effects are also being produced.

Interview with women leaders of SWF

Variety of spices sold by SWF

Interests for saving and loaning by SWF

(4) Other positive and negative impacts

One of the remarkable impacts created by this project was the cultivation of good women leaders of SHGs who encouraged other women to participate in social activities while leading their activities, as well as advising on personal problems. As described above, these leaders participate actively in other projects as facilitators or lecturers and play crucial roles even in the projects conducted outside of the Una District in HP State.

On the other hand, the ongoing CDHP, which covered five districts including the Una District, does not substantially utilise the human resources and facilities provided by this project, although some beneficiaries and SHGs of this project overlap. In order to maximise the effects,

[24] The interview was conducted with 12 leaders.

the resources provided by this project should be actively used by CDHP to achieve diversification of the crops in the same area.

In light of the above, this project has achieved its objectives. Therefore, the effectiveness and impacts of the project are high.

Box 2: Animal damages on agriculture and lemongrass production

Kathohar Kuhurd of Amb located in the hilly mountains faces serious agriculture damage by animals. There is a vicious cycle as many farmers tend to migrate to the urban areas and the arable lands are degraded due to no cultivation in the area. Some farmers place fences around their fields against animals; however, it has accelerated the declining agriculture production and decreased the population in the entire community. On the contrary, in Nehri Nouranga of Amb, lemongrass production is emerging among the farmers to protect against animal damages. Lemongrass has sharp leaves, which prevent damages from the animals. It does not require much care to grow, other than regularly cutting the edge of the leaf. At the Pramb Panchayat in Gagret, the production of lemongrass increased, and the production group applied for government funds to purchase a set of herb stills. Now, they extract oils from not only lemongrass but also mint, fennel, and other plants. The extracted oils are expected to be commoditised and introduced to luxury hotels in the urban areas.

Lemongrass field

Herb Still

The experience and training provided by this project have been developed autonomously by the communities as new income-generating activities.

3.4 Sustainability (Rating: ②)

3.4.1 Institutional and Organizational Aspect of Operation and Maintenance

At the end of the project, responsibilities for the facilities provided by each component were assigned, as shown in Table 14.

It was expected that the O&M for the facilities constructed in the government forests and JFM-management forests would be conducted by the FD after the project completion. The facilities constructed in private forests as check dams and the facilities for soil protection were transferred to each PDC, except the area in which there was no JFM. Also, each PDC was responsible for the O&M for these facilities

Table 14: Operation and Maintenance Responsibility by Component

Component	O&M Responsibility
Afforestation	
Nurseries	FD, PDC
Government Land (Including non-JFM)	FD
Private Land	PDC, Individuals (Landowners)
Soil Protection Works	FD, PDC
Soil Protection Works in non-JFM	FD
Civil Works for Soil and Water Management	
Check Dams	PDC
Check Dams in non JFM	FD
Spur and Embankment	PDC
Spur and Embankment in non-JFM	FD
Soil Protection and Land Reclamation	PDC
Facilities constructed in the communities as a part of the livelihood improvement activities	PDC

Source: Documents provided by JICA

According to the interview with the FD, the O&M by the FD has been conducted through their regular monitoring activities under the existing system. Nevertheless, the number of officers and staff (as seen in Table 15) is not sufficient to engage in various activities, as the FD is not only responsible for the O&M of the facilities by the project but also for ceasing forest fires in the dry seasons and raising community awareness. According to the interviews with the officers of the FD, in order to cope with many responsibilities, including O&M, increasing the number of staff in the FD needed to be considered.

Table 15 The Number of Staff at the Forest Department of the Una District (as of June 2019)

Title	The number
Divisional Forest Officer	1
Assistant Conservation of Forest	1
Range Forest Officer	4
Deputy Ranger	26
Forest Guard	66
Forest Worker	38

Source: Forest Department Questionnaire

Some community facilities[25] transferred to the PDCs, such as paths, footbridges, ponds, mangers, and grass cutters, were maintained by the funds collected from the community

[25] In order to construct community infrastructures, which were constructed for the purpose of raising the incentives of the community members, sharing the cost or offering labor by the members were provided. For instance, the cowsheds and mangers provided at an individual house, 50% of the construction cost (maximum 4,000 rupees) was paid by the resident. Also, at certain PDCs, the members participated in the construction work for footpaths.

members, especially in the PDCs where the ownership for the project among the community was developed. These PDCs even applied for government subsidies or collected donations from the residents for O&M. Small-scale check dams transferred to the PDC basically do not require regular maintenance, and in this point of view, few PDCs are doing regular O&M for the check dams.

3.4.2 Technical Aspect of Operation and Maintenance

Several guidelines[26] for O&M were provided during the project and they have been utilised in the FD. Likewise, the *Operation Manual for the Community* (2008) provided by the government of India was also referred by the officers in the field. The large facilities that are managed by the FD are monitored regularly and maintained upon necessity.

Regarding the small-scale facilities transferred to the PDCs, local residents are responsible for the facilities transferred to the community, except for facilities that do not require regular O&M such as check dams. However, the O&M performed by local residents are limited to cleaning ponds and footpath some types of infrastructures are not maintained or unable to be maintained by the communities due to lack of knowledge or information on how to do so. For example, it is difficult for the communities to repair collapsed concrete for soil erosion or footpaths, and funds are required for hiring engineers to fix these facilities (also refer to the 3.4.3 Financial Aspect of Operation and Maintenance). Although most facilities that were inspected at the time of the ex-post evaluation functioned well, some minor problems on the technical sustainability for the facilities transferred to the PDCs were observed.

3.4.3 Financial Aspect of Operation and Maintenance

According to the interview with the FD, the budget for O&M is secured at the moment, and it was also identified that simple O&M activities, such as repairing and cleaning, are managed by the membership fees from user groups in some PDCs. However, many PDCs inspected at the time of the ex-post evaluation mentioned that it was not easy to provide the funds for O&M by the limited government budgets for the PDCs. The facilities transferred to the PDC, such as ponds and check dams, could be improved if appropriate O&M took place. In this circumstance, further possibilities, such as joint managements, as well as financial supports for O&M activities under FD supervision, are expected for the communities. Therefore, it is concluded that there are minor problems identified in financial sustainability.

[26] "Guidelines for Soil Protection and Land Reclamation, Livelihood Component" and "Development of Operational Guidelines for PDC members".

Table 16 Income and Expenditure of the Forest Department in the Una District

Unit: Rupee

	2016	2017	2018
Income	5,168,365	3,061,341	2,466,576
Expenditure	10,177,122	180,570,484	104,243,122

Source: Forest Department Questionnaire

3.4.4 Status of Operation and Maintenance

While the facilities under FD management have maintained activities conducted upon necessity, it was observed that some facilities, such as ponds, dams, and terraces, transferred to the PDCs have problems. For example, one concrete channel was damaged and had collapsed. Also, soil protections were eroded by the water flow. Likewise, it was observed that much waste was dumped around the ponds. It is assumed that if regular check-ups or cleanings are made, the durability and life of the facilities can be extended. As a result of this situation, it can be concluded that there are minor problems in the status of O&M.

Partially Collapsed Water Channel (Dry Season)

Eroded Concrete Embankment

As stated above some minor problems have been observed in terms of the technical, financial, and current status. Therefore, sustainability of the project's effects is fair.

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

This project was implemented with the aim to regenerate the forest, protect the agricultural land, and enhance agricultural and forestry production in the catchment area of the Swan River, in the Una District of HP State by carrying out integrated watershed management activities, including afforestation, civil works for soil and river management, soil protection and land reclamation, and livelihood improvement activities, thereby improving the living conditions of people, including the poor, in the catchment area. The objective of the project consisted with

the development plan and (development) needs of India, and Japan's ODA policy at the time of the appraisal, therefore, the relevance of the project is high. The expected outputs of the project were produced, while some changes—extending areas of afforestation in public lands and adopting "Panchayat" as an implementation unit instead of "Ward"—had to be made during the project. The project period and cost were within the plan, thus the efficiency is high. Quantitative and qualitative effects were identified through the afforestation, soil protection, and various cultivation technology introduced by the project, as well as the income-generating activities through agriculture. Many residents in the project area recognised improvement of their lives, particularly women's self-help group (hereinafter referred to as SHG) activities that were enhanced by the project, have been developed well, and institutional activities were also established in certain areas. As another positive impact, some leaders of the women's SHGs became resource persons in the other projects. From the those facts, the effectiveness and impact of the project are high. Minor concerns were found in the technical, financial, and operation and maintenance (O&M) components, and, therefore, the sustainability of the project effect is fair.

In light of the above, the evaluation result of this project is highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Forest Department of HP State Government

(1) Strengthening the capacity building for forest guards who communicate with the communities

At the afforestation component, private lands managed by the community were increased. The activities of SHGs have been developed and diversified among the communities such as the SWF at the time of the ex-post evaluation. Most small-scale infrastructures are provided within the communities, so if the awareness of the community members for O&M activities rises, it is expected that the durability of the infrastructure and the sustained effect of the project will also rise. In this regard, to promote joint management of the project effects, further capacity building (natural resource management, supporting SHG's activities, facilitation skills, etc.) of the forest guards who communicate with each community, through regular monitoring of the planting area or facilities, is expected. As a result, they will be able to play an important role in connecting the government and the community.

(2) Providing available financial resources for maintaining the effects by the project's outcomes (afforestation, infrastructures, etc.)

The FD is responsible for the planting areas and large-scale infrastructures and maintained them thorough their ordinary duties at the time of the ex-post evaluation. On the other hand, it is observed that the limited number of staff and resources of the FD will hardly continue to further

assist the SHG's activities and O&M of the infrastructure in the long run. After the project completion, the FD has taken overall responsibility of the project outcomes; however, allocating available financial and human resources for the district level should be considered. Also, utilising particular government schemes for forest conservation or the budget of Una District, if it is available, should be considered.

4.2.2 Recommendations to JICA

(1) Continue assistance for the effects produced by the project through the ongoing JICA project in HP State

Although ongoing JICA ODA Loan Project CDHP includes the area in which this project was implemented, the beneficiaries and SHGs of this project do not always overlap with those of CDHP. The project introduced various cropping technologies and empowered women's SHG activities. These effects, human resources, and facilities developed by the project should be effectively utilised in the ongoing project in order to maximise the impacts.

4.3 Lessons Learned

<u>Project designing by considering the availability of the target areas and the capacity of the executing agency</u>

Since the project focused on the one specific district, it was assumed that the project management and maintenance would be taken over by the FD administration at the district level, despite the fact that the counterpart of this project was HP State's Forest Department. The project targeted integrated watershed management at the specific district and accomplished a variety of activities. Nevertheless, in terms of the effect continuation and maintenance, it is not always easy to manage institutional or financial sustainability in one district while engaging in ordinary duties. It is important to design the project by practically considering the capacity of the executing agency as well as the targeted areas and the number of beneficiaries in terms of the effects' continuation.

<u>Required technical transfer for operation and maintenance to the community members after the facilities are transferred to the community</u>

Small-scale infrastructures (ponds, footbridges, footpaths, irrigation systems, etc.) constructed for the purpose of motivating the communities for the project participation were transferred to each PDC, likewise the responsibility of O&M. At the time of the ex-post evaluation, some PDCs maintained their facilities through membership fees or government funds, but many PDCs were not aware of the O&M, as evidenced by rubbish dumping and concrete damages. Although the project expected to transfer the small infrastructures to the communities at the end of the project, there were no training or awareness-raising activities for

the O&M provided during the project period. Even though O&M for the facilities to be transferred to the communities is simple, O&M should be discussed after the project completion to introduce the necessary O&M technologies among the communities during the project.

Continuous recording operation and effect indicators

Some operation and effect indicators of the project have not been recorded since the completion of the project. Thus, at the time of the ex-post evaluation, it was identified that there were some indicators provided by the FD that were not monitored (Gross Annual Average Farm and Forest Income) or had no changes (planting areas). Also, there was no data or information for the operation and effect indicators available during the project, both in the FD of HP State and the FD in the Una District, and it was necessary to recollect the data and information from the stakeholders at the time of the ex-post evaluation. While loan projects tend to focus on monitoring the progress of the output (particular activities) in general, in order to verify the effectiveness and impact of the project, the operation and effect indicators are very important. Thus, the importance of recording the operation and effect indicators should be conducted during the project, as well as after the project.

(For ODA Loan Project)

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	(1) Afforestation -Renovation and Strengthening of Nurseries (7 locations) -Afforestation of Government Land by Government (2,000 ha) -Afforestation of Government Forests by JFM (2,720 ha) - Afforestation of Private Land (4,150 ha) - Soil Protection Works in Government Forests (Terrace, Wooden Mattress and Earthen Wall) (3,630 ha)	(1) Afforestation -Renovation and Strengthening of Nurseries (10 locations) -Afforestation of Government Land by Government (2,000 ha) -Afforestation of Government Forests by JFM (2,720 ha) - Afforestation of Private Land (4,150 ha) - Soil Protection Works in Government Forests (Terrace, Wooden Mattress and Earthen Wall) (3,585 ha)
	(2) Civil Works for Soil and Water Management (Check Dams, etc.) -Check Dams (Approx. 3,330) ・Small Scale and Brushwood Check Dams ・Large Scale Check Dams (around 10 m) -Spur and Embankment (Approx.14 km) -Ground Sill (Approx. 60 locations) -Riverbed Excavation (Approx. 400,000 m^3)	(2) Civil Works for Soil and Water Management (Check Dams, etc.) -Check Dams (Approx. 19,328) -Spur and Embankment (Approx. 8.5 km) -Ground Sill (Approx. 296 locations) -Riverbed Excavation (0 m^3)
	(3) Soil Protection and Land Reclamation (2,550 ha) -Soil Protection Works (Terrace, Wooden Mattress and Earthen Wall) -Land Reclamation (Ground Levelling, Soil Dressing and Irrigation System)	(3) Soil Protection and Land Reclamation (2,550 ha)
	(4) Livelihood Improvement -Production Activities (Demonstrations related Horticulture, Animal Husbandry, Agriculture, Grass Land Development and Village Ponds Irrigation Development, etc.) -Community Infrastructures (Community Paths, Reservoirs, Schools and Temples renovations etc.) -Income-Generating Activities such as Processing Non-Timber Forest Products and Apiculture, etc. by micro-credit.	(4) Livelihood Improvement - As planned
	(5) Institutional Building (Purchase of Equipment, training and Employment of	(5) Institutional Building -As Planned

	Facilitators, etc.	
	(6) Consulting Services -Preparation survey, Monitoring, Technical advice, and summarizing the experience	(6) Consulting Services -As planned
2. Project Period	April 2006–July 2016 (124 months)	May 2006–June 2016 (123 months)
3. Project Cost Amount Paid in Foreign Currency	249 million yen	108 million yen
Amount Paid in Local Currency	3,984 million yen (1,600 million rupees)	3,385 million yen (1,991 million rupees)
Total	4,153 million yen	4,133 million yen
ODA Loan Portion	3,493 million yen	3,493 million yen
Exchange Rate	1 rupee = 2.49 yen (As of July 2005)	1 rupee = 1.7 yen (As of March 2013)
4.Final Disbursement	July 2016	