

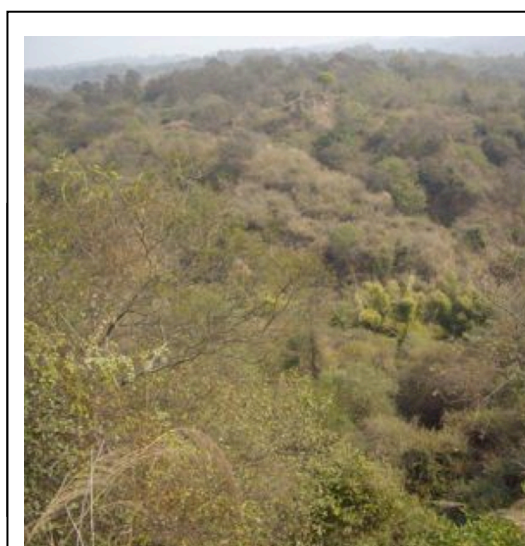
0. Summary

This project aimed to improve self-sufficiency of wood products in the state and to recover degraded environment and to increase forest stock¹ by planting trees and undertaking activities to recover soil and water resources in degraded forest areas with the participatory approach in the State of Punjab. The relevance of the project is high since it is consistent with the policies of the Governments of India and Punjab to promote tree plantation while giving consideration to the welfare of the poor, with development needs of the Punjab State to expand forestry areas, and with the Japanese ODA policies for India that has the priority in poverty reduction and conservation of environment. The effectiveness and the impact are high since tree plantation and soil conservation activities expanded the forest areas, improved the self-sufficiency of wood products, and reduced soil erosion. The efficiency is fair since the budget was within the plan but the period was longer than the plan. The sustainability is high since organizational arrangements, technical aspects, financial resources, and sustenance of the project achievements are all good in Punjab forest department. In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location



Mountains with rich vegetation by plantation

1.1 Background

India used to have rich forests that covered about 40% of her land at the beginning of the 20th century. Because of the subsequent rapid population increase, forest areas were converted to farmland for food production. Trees were felled for making firewood, timber, and pulp. There was also much grazing.

¹ Total volume of tree planted in a given area

Because of these reasons, the forest area was drastically reduced, and forest cover became 22% in 1950. The main industry of Punjab State is agriculture with 82% of the state land being for farming, and the forest areas have been small since past years. State Forest Policy of India aimed at converting 33% of the whole India to forests, but the forest areas of Punjab state is 4.40% (1991), which was far from the goal of 33%. The Government of Punjab state formulated State Forestry Action Plan (1997 – 2017) in 1997 with the main objectives of converting 15% of the state land to forest areas and reducing the gap of demand of wood products and supply. In order to meet these objectives, this project was implemented.

1.2 Project Outline

This project aimed to improve self-sufficiency of wood products in the state and to recover degraded environment and to increase forest stock by planting trees and undertaking activities to recover soil and water resources in degraded forest areas with the participatory approach in the State of Punjab.

Loan Approved Amount/ Disbursed Amount	Phase I: 6,193 million yen/6,188 million yen Phase II: 5,054 million yen /4,809 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	Phase I: December 1997 /December 1997 Phase II: March 2003/March 2003
Terms and Conditions	Interest Rate: 2.1 % Repayment Period: 30 years (Grace Period: 10 year) Conditions for Procurement: General untied
Borrower / Executing Agency	President of India/ Department of Forests and Wildlife Preservation, Punjab
Final Disbursement Date	July 2009

2. Outline of the Evaluation Study

2.1 External Evaluator

Keiichi Takaki, FASID

2.2 Duration of Evaluation Study

Duration of the Study: October 2011 – December 2012

Duration of the Field Study: February 18 – 28, 2012 & August 25 – September 2, 2012

3. Results of the Evaluation (Overall Rating: A²)

3.1 Relevance (Rating: ③³)

3.1.1 Relevance with the Development Plan of India

The Government of India adopted the goal of converting one third of the land to forest areas, and formulated National Forest Policy 1952. Subsequently, she has been engaged in tree plantation with the five year plans. However, since the forest areas were continuously converted to the land for other purposes, and could not stop the reduction of the forest cover, the Government of India formulated National Forest Act in 1988 and has been pursuing below policy measures, giving considerations to the importance of forests from the perspectives of balanced ecosystem and actualizing environmental conservation and sustained economic growth.

1. Maintenance of the natural environment by protecting the ecosystem
2. Preservation of the remaining natural forests with the vast variety of flora and fauna
3. Meeting the basic needs (fuel-wood and others) of the people living in rural areas and those of scheduled caste⁴.
4. Maintenance of the traditional relationship with the forests by preserving the traditional rights of the tribal people and the poor living near forests.

The 10th National Plan (2002-2007) had the objective of promoting sustainable development, taking into account environment and socioeconomic development, and attempted to plant trees and recover degraded forest of 7.5 million hector in five years (1.5 million hector per year), and increase the national forest cover from 19% in 2002 to 25% in 2007, and to 33% in 2012.

The 11th Five Year Plan (2007-2012) at the time of the ex-post evaluation has the policy priority in conserving and expanding forest, which referred to National Forest Policy 1988 and emphasized the importance of people's participation for sustainable forest conservation, and the necessity of improving the livelihood of the poor such as scheduled tribe for sustainable forest recovery.

The Punjab State government formulated State Action Plan for Forest (1997-2017) in 1997 in order to implement the national forest policy in the state with the following seven main points.

1. To increase the forest areas to 15% of the state land (4.4% in 1991)
2. To decrease the difference between the supply of tree products and demands (improve the self sufficiency within the state)
3. To improve the productivity of the existing forest by improving plantation technique and

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

³ ③: High, ② Fair, ① Low

⁴ Scheduled caste is the administrative category after India's independence for the people who lived in India before the immigration of Aryan people who constitute the majority of contemporary India. It is for the purpose of giving them priority measures since they are extremely poor with disadvantages in economic and social opportunities.

planting more productive trees

4. To protect existing forest from fire and other disaster and preserve the diverse ecosystem
5. To recover the ecosystem for the sustainable use of the natural resources in Shiwaliks hills where soil runoff and moisture loss worsens
6. To Promote the cooperation among Punjab Forest Department, related departments and local residents including farmers
7. To strengthen policy and institutional frameworks

From the above, the development policies of the Governments of India and Punjab has been emphasizing improving wasteland and expanding forest areas by the participatory approach from the time of project implementation until that of ex-post evaluation, thus it can be stated that they are consistent with the objective of the project.

3.1.2 Relevance with the Development Needs of India

India used to have rich forest all over the country with 40% of her land being forest at the beginning of the 20th century. Because of the rapid increase of the population, forest became farmland in order to increase food production. Trees were felled for making firewood, timber and pulp. These activities drastically reduced the forest area, and the forest cover became 22% in 1950. In 1999, the forest area in India was 63.73 million hector (composition: dense forest 59%, open forest 40%, Mangrove 1%), constituting 19.4% of the total land.

The main industry of Punjab state has been agriculture and 82% of the land has been farmland with little forest area since past years. The National Forest policy 1988 was to have 33% of the forestland, and forest area in Punjab state was far from it with 4.4% in 1991 in accordance with Punjab state statistics. In terms of the quality of forest, the dense forest was 517km² (37%) , the open forest was 895 km² (63%) and much forest was in the fragile condition, and the percentage of the dense forest was lower than that of the whole country. The one major cause for this was that the soil of the northern areas along the state borderline called “Shiwaliks” was mostly sand, and did not have much vegetation.

Self-sufficiency of wood product in the state was low. In accordance with the research⁵ by Punjab Agricultural University, the demand in the state for the wood was 5.53 million m³ in 1991 and its 75% is consumed by villagers living near the forests, and the change in the supply of the wood products was expected to have much impact on the lives of those people. In order to meet the demand by the supply within the state, about 20% of the forests in the whole state had to be felled, and rapid reduction of the forest was much likely. Because of the subsequent population increase, the demand of firewood and wood product was expected to increase, and the supply was not

⁵ Karam Singh and et al. “Demand for Wood in Punjab”, Punjab Agricultural University. 1991.

expected to increase. It was of much concern that illegal felling may become more prevalent, much forest could have unrecoverable damage, supply of wood products may decrease, and poverty may become much more problematic.

This project increased the areas of thick forest to 736km²(42%) and open forest to 1,028km² (58%)⁶. Although the project increased thick forest and improved the quality of forest, they are not up to the national level. Although forest areas expanded, and the supply of firewood and timber increased, the demand of the local people for the forest resource is high, which makes it necessary to maintain and expand the forest areas furthermore.

From the above, it can be stated that this project was to improve the composition of plantation, expand forest and improve self-sufficiency of wood products, hence it is consistent with the development needs of India and Punjab State.

3.1.3 Relevance with Japan's ODA Policy

Japan's ODA policy has the priorities in improving economic infrastructure (electricity, transportation, and others), and poverty reduction (agriculture/rural development, environmental conservation (plantation)). These were mentioned in the policy dialogue between Japanese economic cooperation mission and the Government of India in March 1995.

In March 2002, Japanese government sent policy dialogue mission for economic cooperation for India with the Government of India, and confirmed four priority areas that were economic infrastructure, environmental conservation, agriculture/rural development, and health/medicine.

This project concerns poverty reduction and environmental conservation among these priority areas, and is consistent with Japan's ODA policies.

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

3.2 Effectiveness⁷ (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

The effectiveness is evaluated by examining whether the project outcomes were achieved. These outcomes were the reduced gap of demand and supply of wood products (improvement of self-sufficiency within the state) and the improved conditions of degraded environment. The indicators are self-sufficiency of wood products for examining the reduced demand-supply gap, and improved conditions of soil erosion and water resource as the result of soil recovery activities

⁶ State of Forest Report 2011, Ministry of Environment and Forest

⁷ Sub-rating for Effectiveness is to be put with consideration of Impact

for examining the improved conditions of degraded environment.

(1) Improvement of self-sufficiency of wood products

It is estimated that the demand of wood products in Punjab state in 1993 was 5.50 million m³ and its 75% was consumed by the local residents living near forests for their firewood and other purposes. The supply of wood products was estimated as 3.15 million m³ (50 thousand m³ from state forest land and 3.1 million m³ from the private land)⁸, and the percentage of self-sufficiency within the state was 57%.

The forest stock in 2011 in the state was estimated to be 15.71 million m³, and the volume that can be supplied as wood products was estimated⁹ to be 6.32million m³. The demand for wood products was estimated to be 7.59 million m³¹⁰, making the percentage of self-sufficiency 83%, which was an improvement from 57% in 1993. Although these volumes of supplies and demands are estimates and the exact comparison is not possible, it can be said that self-sufficiency improved in 2011 compared with that in 1993. (refer to Table 1). From the above, the outcome of improved self-sufficiency of wood product is about to be achieved.

Table 1 . Self-sufficiency of wood products in Punjab state

year	Demand (10,000 m ³)	Supply (10,000m ³)	Self-sufficiency
1993	550	315	57%
2011	759	632	83%

Source : Project Report on Social Forestry in Punjab, Punjab Forestry Department, 1995, India State of Forestry 2011, Ministry of Environment and Forest.

2) Survival rates of trees

The survival rate of trees affect self-sufficiency of wood products, and its data are shown in Table 2. The survival rates for 1998 and 1998 are measured for trees that were planted one to two years prior to the measurement. Since these trees did not pass long period of time, the survival rate was 87% or 88%. The survival rates for 2006 and 2011 were measured for trees that were planted one to four years prior to the measurement. Since they include more trees planted for longer periods, they were subject to illegal felling and disease, which made the survival rates between 60% and 70%. Since Punjab state has the criterion of survival rate that more than 51% is good¹¹, the survival rate of 60%-61% are sufficiently good. The improvement in forest stock mentioned previously was the result of the plantation that took into account that the survival will become of this level.

⁸ Project Report on Social forestry in Punjab, Punjab Forestry Department, 1995

⁹ The calculation of annual yield is by Von Mantel method (annual yield = annual growing stock volume x 2/the number of rotation years)

¹⁰ India State of forestry 2011, Ministry of Environment and Forest

¹¹ Notification (July 23, 1986) Forest & Soil Conservation Department, Government of Punjab

Table 2. Survival rate of planted trees

	Hill areas (%)	Plain areas (%)
1998	87	87
1999	88	88
2006	70.6	65.5
2011	61	60

Source: Punjab Forest Department

(2) Improvement of degraded environment in hill and plain areas

1) Reduction of soil erosion

The project contributed to reducing soil erosion by soil treatment measures that prevented soil erosion by covering soil surface, and vegetative measures that stabilized surface soil by planting short trees. Soil treatment measures were implemented in Phase I from 1997 to 2002 as planned and in Phase II from 2003 to 2010 with some delay. The vegetative measures were implemented in Phase I from 1997 to 2002 as planned and in Phase II from 2003 to 2005 as planned.

Punjab Forest Department gave a contract to a private consultancy company to examine the effectiveness of the project after its implementation¹². This survey was conducted by the comparison of areas affected by soil erosion between 2006 and 2008 by different types of soil erosion in 21 villages where they had soil erosion among 22 villages that were randomly selected¹³.

In the whole village, the number of villages that had sheet erosion in the broad range was reduced from six in 2006 to one in 2008. The number of villages that had gully erosion in a broad range was reduced from two in 2006 to one in 2008. The number of villages that had bunk cutting in the broad range was reduced from four in 2006 to one in 2008. As the result of the reduction in the soil erosion, those villages that had the soil erosion in the broad range in 2006 became those villages that had it in the middle or narrow ranges in 2008. This indicates the improvement of soil degradation as the result of the construction of check dams and others that were the component of soil conservation activities of the project (please refer to Table 3).

¹² Monitoring and Evaluation of Project Activities under Punjab Afforestation Project, Punjab Department of Forestry, 2009.

¹³ In order to measure the project achievements, the data should have been collected before and after the project implementation. However, the data before the project implementation are not available, and data collected during the project implementation are those mentioned in this evaluation. Although there is some limitation, this evaluation uses these data of 2006 and 2008.

Table 3. Conditions of erosion and soil degradation (Whole village)

Categories by the extent of erosion areas Types of soil erosion and description	Narrow range (Less than 20% of village area)		Middle range (from 20% to 40% of the village area)		Broad range (from 40 to 60% of the village area)		Broader range (More than 60% of the village area)		total
	'06	'08	'06	'08	'06	'08	'06	'08	
The number of villages that had any type of erosion and soil degradation	17	17	3	4	1	0	0	0	21
Sheet erosion (Run-off of surface soil)	8	10	7	10	6	1	0	0	21
Gully erosion (deep belt-shaped cut in soil)	7	14	12	6	2	1	0	0	21
Bank cutting (erosion of river bunks)	9	12	8	8	4	1	0	0	21
Soil deposition (soil accumulation of low land)	12	15	6	5	3	1	0	0	21
Roadside erosion	14	16	5	5	2	0	0	0	21

Source : Punjab Forest Department

Table 4 shows the conditions of 19 villages that had forests among 21 villages, and shows the erosion conditions in forest areas. The number of forest areas that had sheet erosion in the middle range was reduced from nine in 2006 to six in 2008 while the number of forest areas that had sheet erosion in the narrow range increased from nine in 2006 to 12 in 2008. The number of forest areas that had gully erosion in the middle range did not change from 11 in 2006 to 2008. The number of forest areas that had gully erosion in the narrow range increased from four in 2006 to nine in 2008. This means that the number of forest areas that had gully erosion in the broad range decreased from four in 2006 to zero in 2008, and these four forest areas may have joined the category of the narrow range, or they joined the category of middle range, and those of the category of the middle range joined the category of the narrow range. In either case, this indicates that the range of gully erosion became smaller and may indicate the improvement of soil degradation as the result of soil conservation component of the project.

Table 4. Conditions of erosion and soil degradation (Forest area)

Categories by the extent of erosion areas Types of soil Erosion and description	Narrow range (Less than 20% of forest area)		Middle range (from 20% to 40% of the forest area)		Broad range (from 40 to 60% of the forest area)		Broader range (More than 60% of the forest area)		total
	'06	'08	'06	'08	'06	'08	'06	'08	
The number of villages that had any type of erosion and soil degradation	13	17	6	2	0	0	0	0	19
Sheet erosion (Run-off of surface soil)	9	12	9	6	1	1	0	0	19
Gully erosion (deep belt-shaped cut in soil)	4	8	11	11	4	0	0	0	19
Bank cutting (erosion of river bunks)	6	13	10	5	3	1	0	0	19
Soil deposition (soil accumulation of low land)	7	14	10	5	2	0	0	0	19
Roadside erosion	13	15	4	4	2	0	0	0	19

Source : Punjab Forest Department

2) Achievement of soil conservation activities

Soil degradation reduced moisture-holding capacity of soil, and dried many wells. This affected availability of water for the local residents for drinking and for agricultural production. In order to improve the conditions of water resources, this project attempted to improve soil conditions and increase the moisture-holding capacity of soil. In order to find out the change in the moisture holding capacity of soil, the survey collected data on the changes of the use of wells of different types (please refer to table 5). Among all the villages assisted by the project, 22 villages were selected by random sampling, and the number of villages in 2006 and 2008 were compared¹⁴. Table 5 indicates that many villages had water returned in their wells, and agricultural land had supply of water in broader areas by irrigation. This indicates the achievement of soil conservation activities.

¹⁴ Please refer to footnotes 13 of Page 7.

Table 5. Conditions of water by the types of wells

Use conditions of water source Type of water source	The number of villages		The number of water sources usable		The number of water source usable throughout year		The number of water source used for irrigation		Irrigated area irrigated (ha)	
	'06	'08	'06	'08	'06	'08	'06	'08	'06	'08
Shallow open well*	18	22	157	209	145	178	8	14	22	32
Shallow tube well**	12	22	75	161	71	154	74	154	209	388
Deep tube well***	11	19	57	77	55	75	50	66	862	1183
Hand pump****	14	19	431	513	237	449	0	0	0	0
Total			720	960	508	856	132	234	1093	1603

The depth of each water source is as below.

*20 feet **50 feet ***150 feet **** 25-125 feet

Source : Punjab Forest Department

From the above, it can be said that the reduction of soil erosion and recovery of water source indicates that the outcome of improving environmental degradation in the hill and plain areas was achieved.

3.2.2 Qualitative Effects

For improving self-sufficiency of wood products, the supply has to increase, for which forest protection is important. The Government of India started to organize Joint Forest Management Committee (JFMC) in 1990 in order to promote forest protection by the participatory approach in the whole nation¹⁵. Punjab State started JFMC in 1993¹⁶ and this project started forest protection activities with JFMC in 256 villages since 2003 when Phase II was started.

1) Strengthened Forest Protection

The main role of JFMC is to protect forest from illegal felling and fire, to plant trees, and manage Non Timber Forest Product (NTFP) that includes fodder, grass for making ropes, and fruits such as mango in collaboration with Punjab Forest Department. JFMC has the governing body with 10 to

¹⁵ The Government of India started forest protection with the participatory approach in the whole nation by its notifications of 1990 and 2000. With the assisted of the forest department of each state and NGO, people organized JFMC, and formulated forest management plan called microplans with the assistance from technical and social perspectives. Based on this microplan, JFMC received seedlings from the forest department and engaged themselves in plantation, forest protection and nurturing the trees.

¹⁶ India State of Forest Report 1999, Ministry of Environment and Forest

15 members that include chairperson (usually village chief), vice chairperson, and the accountant, and they are elected every year. JFMC has about 30 members including the members of the governing body.

In collaboration with JFMC, Punjab Forest department undertakes activities to prevent illegal felling, illegal grazing, ban entries to areas where plantation is new and requires protection. The number of forest offenses decreased by 33% in 2008 from 2003, although it slightly increased from 2006 to 2007 (refer to Table 6).

Table 6. The numbers of Forest Offenses in Punjab State

Year	2003	2004	2005	2006	2007	2008
The number of forest offense	7,241	5,443	4,116	4,193	4,862	4,810
Percentage of decrease vis-à-vis 2003		24	43	42	32	33

Source : Punjab Forest Department

2) Change in the awareness of the local people on forest protection

JFMC may be contributing to the decrease of forest offenses. At the time of the ex-post evaluation, one JFMC member said, “I became aware of the importance of forest by becoming a member of JFMC. If I find offenders, I try to persuade them to stop it with other members, and if they do not stop, I report to Forest Department.” Another JFMC member said, “Many forest offenders were local residents, but they became members of JFMC, realized the importance of forest and they are now on the side of protecting the forests.”

These changes of awareness and behaviour of the local residents on forest protection are shown in the results of the beneficiary survey¹⁷. This project promoted forest protection by the participatory approach from its Phase II, and the survey collected data on the changes of the local residents of each year from 2003 (when Phase II started) to 2011. Figure 1 indicates the changes in people’s sense of responsibility in environmental protection¹⁸ and those of their responsible use

¹⁷ The respondents of the beneficiary survey was selected by randomly selecting 5 villages among all 256 villages assisted by the project, then 20 JFMC members of those 5 villages were randomly selected, totaling the number of the respondents as 100. It should be noted that the data are based on the recollection of the respondents and may not be accurate.

¹⁸ The actual question was “How responsible do you think people were in protecting the natural environment in each year from 2003 to 2011?” and the response was by the scale of 5=much responsible, 4=responsible, 3=neutral, 2=not responsible, 1=not responsible at all.

of forest resources¹⁹. Each graph indicates that in 2003, people did not necessary have sense of responsibility in environmental protection, and in 2006 they began to have it, and continued to strengthen it. Similarly, people became more responsible in using forest resource. The results of the survey indicate that because people changed their awareness on environmental protection, and they became more responsible in using forest resources, and these contributed to reducing the number of forest offenses (please refer to Table 6).

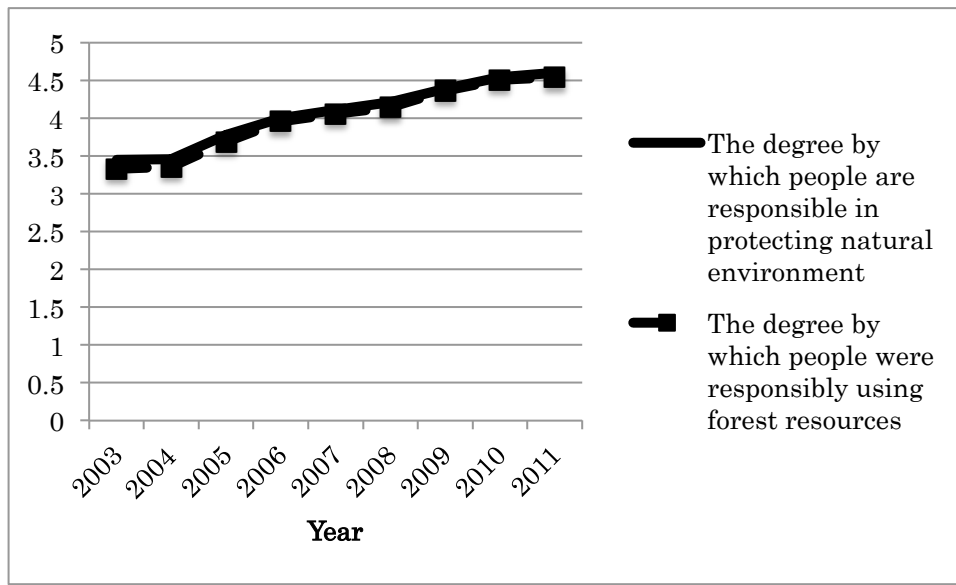


Figure 1. People’s sense of responsibility in protecting natural environment and the responsible use of forest resources
Source: beneficiary survey

3) Nurturing trust relationships between local residents and Forest Department.

Local people were not actively engaged in the forest protection at the beginning of the project implementation. During the implementation of the project, Punjab Forest Department nurtured the relationship with the people through JFMC, and they became gradually active in the forest protection. At the beginning of the project, the department and the people did not have good relationships since it was restricting tree felling in the land owned by an individual and a group of individuals on the ground of the Forest Act 1927 and others. The officials of Punjab Forest Department said, “At the beginning of the project implementation, most people at the forest department found it very difficult to have the cooperation of the local people.” Later in the project implementation, the relationship between the people and the department improved, and people became more actively engaged in JFMC.

In order to nurture the relationship, and improve the organizational effectiveness of JFMC, Punjab

¹⁹ The actual question was “How much responsibly people were in using the forest resources in each year from 2003 to 2011?” and the response was by the scale of 5=much responsibly, 4=responsibly, 3=neutral, 2=not responsibly, 1=not responsibly at all.

Forest Department implemented the scheme of entry point activity that provided the villages with what people needed such as school classrooms and paved road for free. They also expanded the organizational arrangement to support people in order to nurture the trust relationships. The department divided the state into 17 divisions and assigned officers to each for the task, and 5 divisions among 17 had JFMCs supported by the project. At the beginning of the project, the department supported JFMC with the regular work arrangement, but staff and know-how was not sufficient, and their support was not sufficient. In December 2005, the department expanded the arrangement to support JFMC by recruiting facilitators with social science background, and assigning them in each division. Under the direction of the Coordination and Resource Unit, each division had four to seven facilitators, and each division supported JFMCs of 36 to 62 villages (refer to Figure 2). By assigning the facilitators for each division, the same facilitators can visit the village and became familiar with the villagers, know the situations and needs of the villages and this facilitated development trust relationships with villagers.

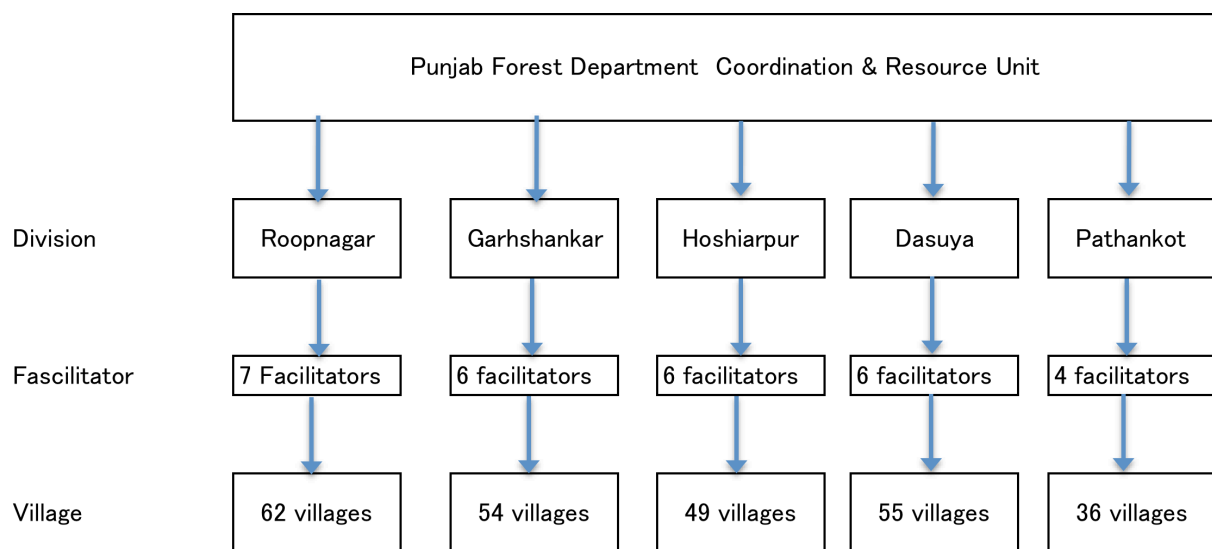


Figure 2. Support arrangement for villages

Source: Punjab Forest Department

The beneficiary survey asked JFMC members the degree by which the Punjab Forest Department was responsive to the community needs²⁰ and the degree by which people trusted the department²¹. These indicate the effectiveness of entry activity and support arrangement for the villages. As Figure 3 shows, the responsiveness of Forest department improved similarly to the degree of

²⁰ The actual question was “How much responsive was the Punjab Forest Department to the needs of the community in each year from 2003 to 2011?” and the response was by the scale of 5=very much, 4=much, 3=neutral, 2=not so much, 1=not at all.

²¹ The actual question was “How much did you trust the Punjab Forest Department in each year from 2003 to 2011?” and the response was by the scale of 5=very much, 4=much, 3=neutral, 2=not so much, 1=not at all.

people’s trust in the department. This trend indicates that as the department responded to the people’s need, they earned people’s trust.

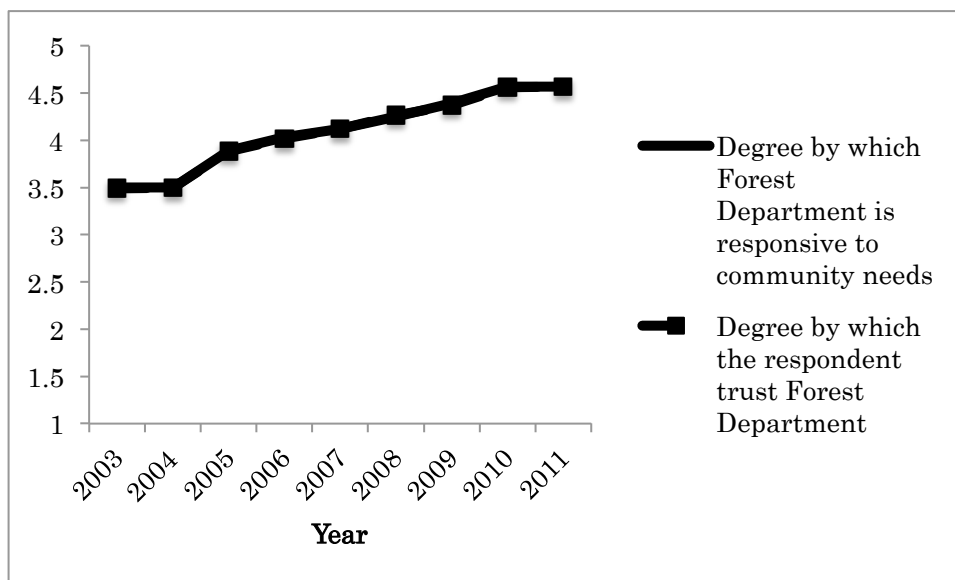


Figure 3. Forest Department’s responsiveness to people’s needs and people’s trust in the department
Source: beneficiary survey

Punjab Forest department nurtured trust relationship with villagers, promoted active participation in JFMC activities and enhanced JFMC effectiveness to manage forest resource by trainings. This is indicated by the beneficiary survey on the changes of “the degree by which JFMC members actively participated in JFMC activities²²” and “the degree of JFMC effectiveness²³” As shown in Figure 4, for both questions, they were neither good nor bad in 2003. As years went on, people became more active in JFMC activities, and JFMC became more effective. This indicates that people’s relationship with the Forest Department improved, people’s participation was promoted, and these contributed to improvement in their effectiveness.

From the above, although the relationship between the forest department and the local people was not so good, they were improved by the forest department efforts to meet the people’s needs. Then, people became more active in JFMC activities, JFMC became more effective, and people became more aware of the importance of environmental protection, and became more responsible in the use of forest resource by complying with rules. All these contributed to the forest protection.

²² The actual question was “How much actively were you participating in JFMC activities in each year from 2003 to 2011?” and the response was by the scale of 5=very actively, 4=actively, 3=neutral, 2=not so actively, 1=not actively at all.

²³ The actual question was “How effective was your JFMC in its activities in each year from 2003 to 2011?” and the response was by the scale of 5=very effective, 4=effective, 3=neutral, 2=not so effective, 1=not effective at all.

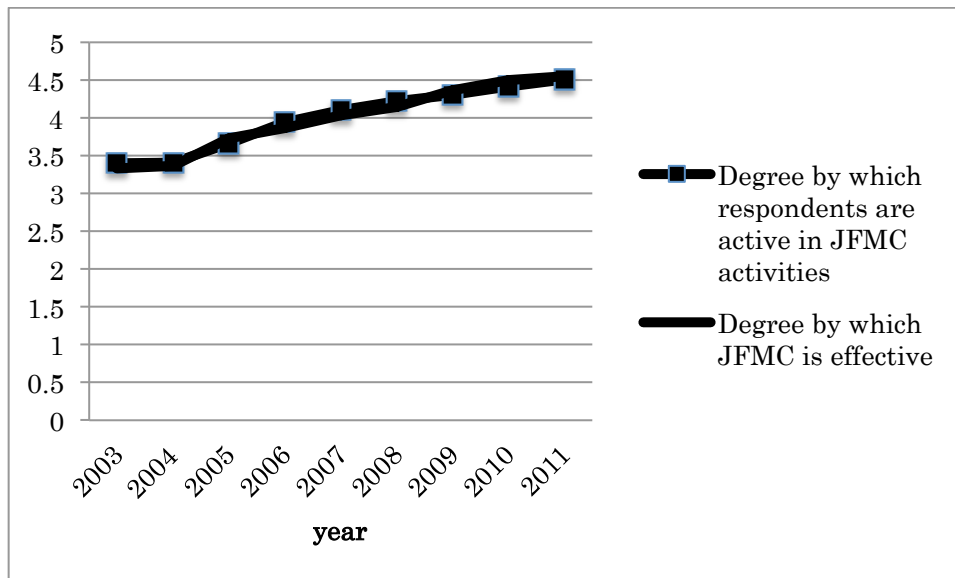


Figure 4. Members' activeness in JFMC activities and effectiveness of JFMC
Source: beneficiary survey

3.3 Impact

3.3.1 Intended Impacts

The impact of the project was to expand forest stock. The total volume of forest stock was 7.1 million m³ in 1993²⁴, and was 15.71 million m³ in 2011²⁵, thus it was achieved.

3.3.2 Other Impacts

(1) Diversification and promotion of economic activities of the people.

Punjab Forest Department tried to establish Self Help Group (SHG) in 256 villages in order to promote economic activities of the people in order to contribute to income increase. In December 2008, 348 SHGs in 219 villages were established, and the total number of the members was 4,755. Their economic activities were chosen by themselves, and they were sewing, embroidering, rope making, candle making, soap making, dairy, and retails, contributing to diversification of economic activities.

Punjab State Department provided technical skills to each group necessary for their activities, and provided loan. This loan scheme was implemented through JFMC. JFMC assesses the business plan of SHG and provided loan to those who passed the assessment. There is no direct connection between SHG and JFMC, and there are those who belong to both groups.

The survey²⁶ conducted by a consulting company on contract by the Forest Department indicated the SHG activities contributed to poverty reduction of the SHG members. This survey randomly

²⁴ Project Report on Social Forestry in Punjab, Punjab Forestry Department, 1995.

²⁵ India State of Forestry 2011, Ministry of Environment and Forest.

²⁶ Monitoring and Evaluation of Project Activities under Punjab Afforestation Project, Punjab Department of Forestry, 2009.

sampled 142 members and they answered that their income that included that from SHG activities increased from 28,721 rupee to 35,944 rupee.

(2) Increased income of the people

The beneficiary survey collected data of monthly income of each household on average and the income from SHG in each year from 2003 to 2011. From these data, I calculated annual income from non-SHG and SHG activities as shown in Figure 5. The household income was about 30,000 rupee in 2003, and became about 82,000 rupee in 2011. The average annual income from SHG activities was 3,100 in 2003, and gradually increased to 11,000 rupee in 2011. The percentage of income from SHG activities was 10% and became 13%, an increase by 3% in 2011, which indicates the modest contribution to the income by SHG activities.

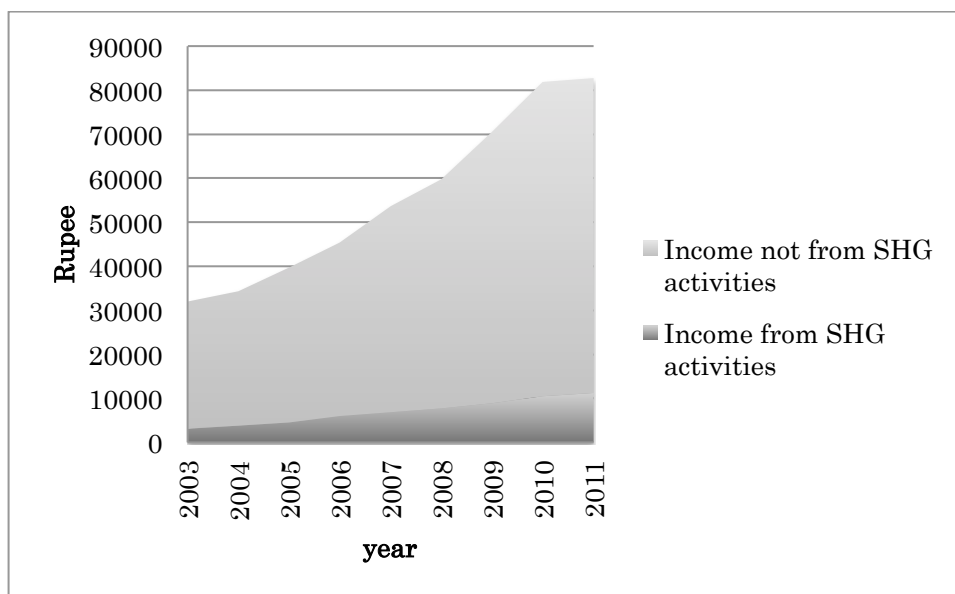


Figure 5. Trends of the income trend of the respondents
Source: beneficiary survey

Together with the project’s contribution to household income by SHG activities, people are more satisfied with their cash income. The beneficiary survey asked the respondents how sufficient was the cash income²⁷, and the result shows that the level of sufficiency increased gradually from 2003 to 2011 (Please refer to Figure 6).

²⁷ The actual question was “How sufficient was your income for meeting cash needs of your household? And the responses were with the scale of 5=more than sufficient, 4=sufficient, 3=neutral, 2=not sufficient, 1=not sufficient at all.

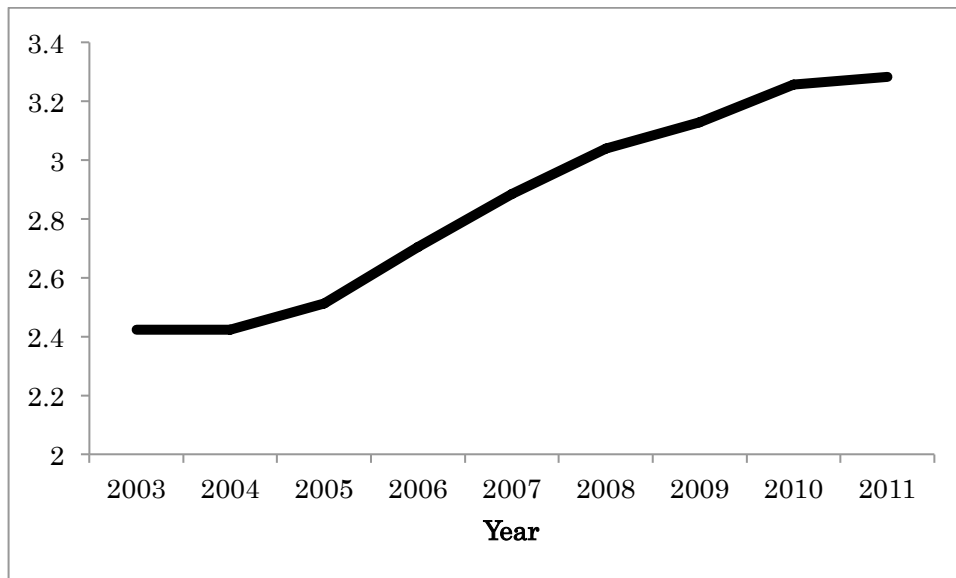


Figure 6. The degree of sufficiency of cash income for respondents' households
Source: beneficiary survey

(3) Limitation of use of forest resource

Although JFMC's forest management restricted the use of forest resources, it did not negatively affect poor people who were using Non-Timber Forest Product (NTFP) that included fodder and plants for rope making and medicinal use since villagers had the priority in the use of NTFP.

From the above, it can be stated that this project has high achievements, thus its effectiveness and impact are high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

An output of this project was to plant and undertake activities to recover soil and water resource in degraded forest areas with participatory approach in Punjab State, and the concrete activities were planting trees and construct facilities for soil recovery and water resource development.

Plantation was mostly done as planned. (Refer to Tables 7 and 8). The outputs of Phase I were brushwood check dams, dry stone masonry check dams, and crate wire structures in streams/choes and they were as planned (refer to table 9). The outputs of Phase II were brushwood check dams, and dry stone masonry check dams and they were constructed more than planned. Punjab Forest Department explained that the reason why crate wire structures in streams/choes were constructed less than planned was the increased prices of the materials. I could not collect the information of why the renovation of village ponds and installation of new village ponds were made less than the plan (refer to Table 10).

Table 7. The plan and actual of plantation activities by plantation models (Phase I)

Area Plantation Model	Plan (1997)	Actual (2002)	Ratio of the actual to the plan (%)
Enrichment Planting ²⁸ (ha)	25,000	25,120	100.4
Vegetative Shrub Barriers ²⁹ (ha)	2,500	2,275	91.0
Bamboo Planting (ha)	1,800	1,802	100.1
Bamboo Working (ha)	2,000	1,700	85.0
Rehabilitation of Degraded Forests (ha)	20,000	20,151	100.8
Reclamation of Saline/Alkaline areas (ha)	5,000	5,000	100
Reclamation of water logged areas (ha)	2,450	2,433	99.3

Source : Punjab Forest Department

Table 8. The plan and actual of plantation activities by plantation models (Phase II)

Area Plantation model	Plan (2003)	Actual (2009)	Percentage of the achievement vis-à-vis the plan (%)
Enrichment Planting (ha)	11,000	11,005	100.0
Vegetative Shrub Barriers (ha)	1,200	1,200	100.0
Silvipasture in Shiwaliks (ha)	400	400	100.0
Bamboo Working (ha)	300	307	102.3
Rehabilitation of Degraded Forests (ha)	6,500	6,677	102.7
Reclamation of Saline/Alkaline areas (ha)	800	800	100.0
Reclamation of water logged areas (ha)	700	706	100.9

Source : Punjab Forest Department

²⁸ This model plants young trees among existing ones For the purpose of increasing the density of trees of a given species.

²⁹ This model plants low trees to stabilize the surface soil for the purpose of preventing soil erosion.

Table 9. Plan and actual of outputs (Phase I)

Soil conservation and water management works	Plan	Actual	The difference from the plan
Silt retention dams (Earthen) (no)	366	366	0
Dry stone masonry check dams (no)	266	266	0
Crate wire structures in streams/choes (no)	16	16	0

Source : Punjab Forest Department

Table 10. Plan and actual of outputs (Phase II)

Soil conservation and water management works	Plan	Actual	The difference from the plan
Brushwood check dams (no)	246	300	+54
Dry stone masonry check dams (no)	200	362	+162
Crate-wire structures in streams/choes (no)	130	70	Δ60
Renovation of village ponds (no)	100	63	Δ37
New village ponds (no)	110	27	Δ83

Source : Punjab Forest Department

3.4.2 Project Inputs

3.4.2.1 Project Cost

Yen loans approved in L/A were 6,193 million yen for Phase I and 5,054 million yen for Phase II. The loan disbursement amounts were 6,188 million yen for Phase I and 4,809 million yen for Phase II. The percentages of the disbursement vis-à-vis the L/A approved amounts were 99.9% and 95.1 respectively and these were within the plan. The budgets of the Punjab State Government were 278 million rupee for Phase I and 615 million rupee for Phase, and the actual expenditures were 190 million rupee for Phase I and 698 million rupee for Phase II. The percentages of the expenditure to the budget were 68.3% and 113.5% respectively. The totalled budgets and expenditures of Phase I and Phase II were 893 million rupee and 888 million rupee and the percentage of the expenditure to the budget was 99.4% and was within the plan (refer to Table 11). From the above, the project expenditure was lower than planned

Table 11. Comparison of the budget and expenditure

	Yen Loan (million yen)			Punjab State Government Budget (million rupee)		
	Plan (L/A approval)	Actual (Disbursement)	Percentage of the actual vis-à-vis the plan (%)	Plan	Actual	Percentage of the actual vis-à-vis the plan (%)
Phase I	6,193	6,188	99.9	278	190	68.3
Phase II	5,054	4,809	95.1	615	698	113.5

Source : JICA and Punjab Forest Department

3.4.2.2 Project Period

The planned project period was from December 1997 to March 2007 (112 months) for Phases I and II and the actual was from December 1997 to March 2010 (148 months). The percentage of the actual vis-à-vis plan was 132%. The reason of delay was the delayed disbursement by the Punjab State Government, which delayed the activities in soil conservation and research. Thus the project period was longer than planned.

3.4.3 Results of Calculations of Internal Rates of Return (IRR)

Economic Internal Rate of Return (EIRR) was 27% at the time of appraisal and was 39.2% in 2011. The cost and the benefit are as in Table 12. The reason why EIRR increased in 2011 was that although some leaves and plants were assumed having no monetary value or undervalued at the time of plan in 2004, they were actually the income source of the local residents as they were used for medicinal purpose and fodder. Taking the monetary value into account, some unit prices of the benefits were increased.

Table 12. EIRR

	Plan (2004)	2011
EIRR	27%	39.2%
Cost	Plantation, soil conservation, forest conservation/fire prevention, research & development, extension/awareness/training, equipment/office, wages/miscellaneous	
Benefit	Sales of Timber, firewood, leaves, bamboo, grass, leaves, and fruit, CO ² reduction effect	
Project life :	67 years	

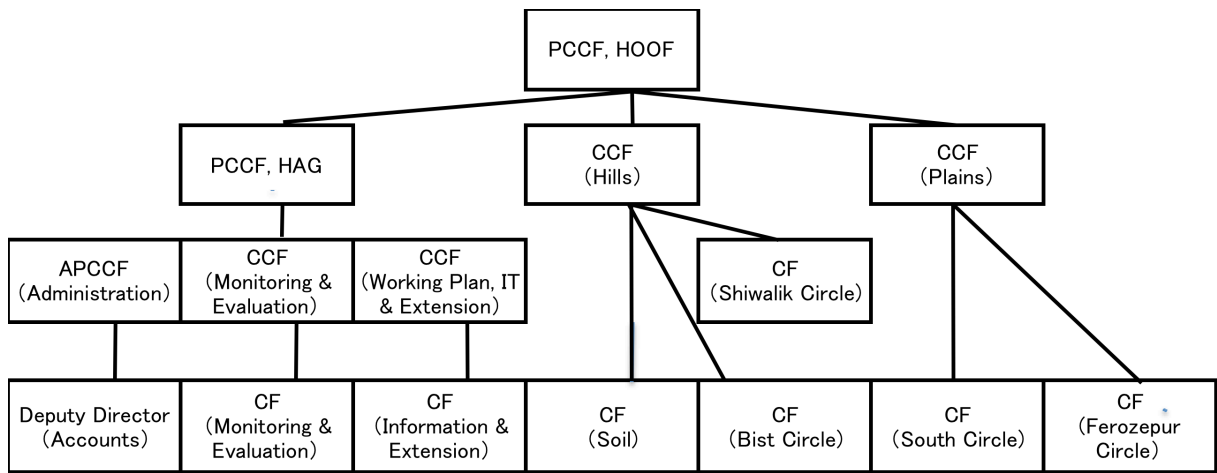
Source : Punjab Forest Department

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

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

Punjab forest department is an implement agent of this project, and plan and implement projects for conserving forest and wildlife as one department of the state. The department has the organizational arrangement headed by PCCF, HOFF (Principal Chief Conservator of Forests, Head of Forest Force) in the headquarters and has PCCF (Principal Chief Conservator of Forests) and two CCFs (Chief Conservators of Forests) who are in charge of the headquarters' administration, and plain and hill areas under him (please refer to Figure 7).



PCCF, HOFF: Principal Chief Conservator of Forests, Head of Forest Force
 PCCF, HAG: Principal Chief Conservator of Forest, Higher Administrative Grade
 APCCF: Additional Principal Chief Conservator of Forest
 CCF: Chief Conservator of Forests
 CF: Conservator Forest

Figure 7. Organizational Chart of Punjab Forest Department
 Source : Punjab Forest Department

Punjab Forest Department has the decision-making hierarchy as described above. In addition, they also have the hierarchical arrangement for the maintenance and operation activities at the field level (refer to Table 13) .

Table 13 Demarcation of Punjab State at the field level

Demarcation	Units and the number of the Lower rank	Official in charge of each unit and the total number of the officials in Punjab state
Division	4-5 ranges	2 Chief Conservators of Forest (Plan/Hill areas) 17 Divisional Forest Officers
Range	10-8 forest blocks	107 Rangers
Forest block	3-2 beats	240 Foresters
Beat	3-2 villages	980 Forest Guards

Source : Punjab Forest Department

In the field, Punjab Forest department maintains the project outputs in collaboration with JFMC in each village. Foresters and Forest guards regularly patrol and maintain plantations in the State Forest land. Plantations owned by villagers are maintained by villagers who are members of the JFMC that employs guards to patrol the forest as needed. Foresters and Forest Guards of the Punjab Forest Department maintains soil conservation facilities such as check dams in collaboration with JFMC, and if the repair is needed, expenditure is covered by the project for Punjab forest watershed development described later. From the above, it can be stated that the organizational arrangement does not have problems to manage and operate the project outputs.

3.5.2 Technical Aspects of Operation and Maintenance

Chief Conservators and Conservators of Punjab Forest Department are the specialists in plantation, soil conservation, or civil engineering. They planned and implemented plantation and construction of check dams and other facilities for soil recovery with the labour of the local people, and they produced outputs as planned.

As for the maintenance of trees, all the trees are numbered and recorded and Foresters assigned to each section regularly monitor the trees.

Punjab Forest Department said that the local people are engaged in plantation and the construction of soil recovery facilities, and learned necessary skills. Therefore, they have no technical problem in the maintenance of the project outputs.

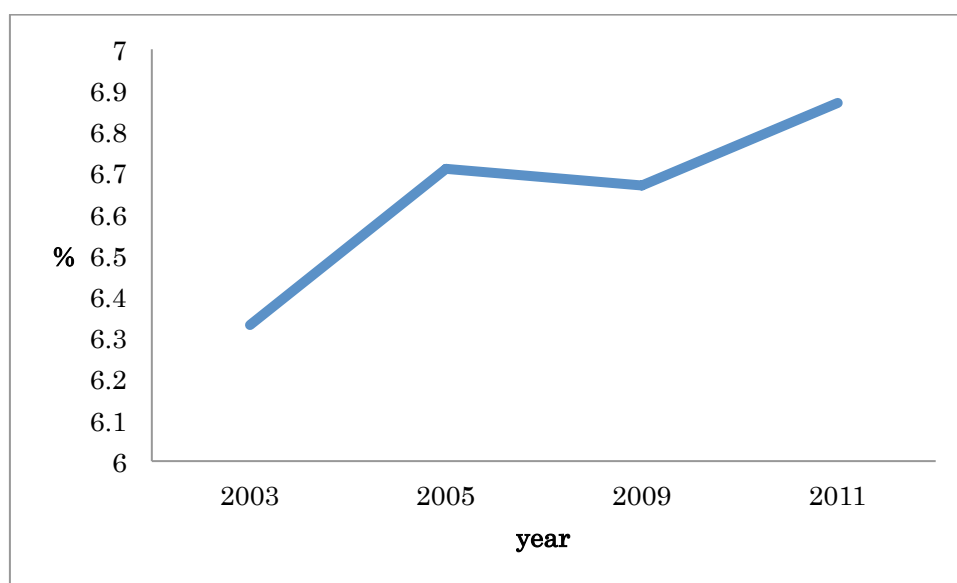


Figure 8. Trends of forest cover in Punjab state
Source : Forest Survey of India

Figure 8 shows that the forest cover in Punjab State increased from 6.33% in 2003, to 6.71% in 2005, and to 6.87% in 2011 and continues to increase after the project implementation while it decreased to 6.67% in 2009. This indicates the appropriate management of the existing forests and new plantation, and this shows that there is no technical problem at the forest department.

From the above, Punjab Forest Department has no problem in technical aspects in the maintenance and operation.

3.5.3 Financial Aspects of Operation and Maintenance

Punjab Forest Department formulated Watershed Development project in Punjab State with Punjab State budget and started the implementation since FY2010³⁰. Table 14 shows that the budget was 74,210,000 rupee in FY2011 and the expenditure was 72,601,000 rupee. The official of the Punjab Forest Department said that the budget is sufficient for the operation and maintenance of the project outputs, and similar level budget will be available in the future. JFMC manages its own fund by keeping records of income, expenditure, and the purpose. Punjab Forest Department does not monitor the finance of JFMC although as mentioned in the qualitative effect, JFMC is functioning.

Table 14. Budget and expenditure of the project for Punjab forest watershed development in FY2011

Item	Budget (Thousand Rupee)	Expenditure (Thousand Rupee)
Wage	60,368	60,575
Materials (seeds, pesticide, and others)	11,650	10,072
Fuel and others	850	849
Office expenses	650	607
Others	700	698
Total	74,218	72,601

Source : Punjab Forest Department

3.5.4 Current Status of Operation and Maintenance

The project outputs such as trees and check dams, ponds, and irrigation facilities are maintained by Punjab Forest Department and JFMC. I visited these facilities, and found that the conditions are mostly good, and functioning. I asked Punjab Forest Department to rate the conditions of maintenance of the trees and these facilities with the five scale³¹, and they gave five (very good) and the project outputs are mostly in good conditions. From the above, the conditions of maintenance are good.

³⁰ The fiscal year in India starts from April and ends in March in the next year.

³¹ The meanings of ratings are 5=very good, 4=good, 3=neutral, 2=bad and 1=very bad.

From the above, it can be said that no major problems have been observed in the operation and maintenance system, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to improve self-sufficiency of wood products in the state and to recover degraded environment and to increase forest stock by planting trees and undertaking activities to recover soil and water resources in degraded forest areas with the participatory approach in the State of Punjab. The relevance of the project is high since it is consistent with the policies of the Governments of India and Punjab to promote tree plantation while giving consideration to the welfare of the poor, with development needs of the Punjab State to expand forestry areas, and with the Japanese ODA policies for India that has the priority in poverty reduction and conservation of environment. The effectiveness and the impact are high since tree plantation and soil conservation activities expanded the forest areas, improved the self-sufficiency of wood products, and reduced soil erosion. The efficiency is fair since the budget was within the plan but the period was longer than the plan. The sustainability is high since organizational arrangements, technical aspects, financial resources, and sustenance of the project achievements are all good in Punjab forest department. In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

none

4.2.2 Recommendations to JICA

none

4.3 Lessons Learned

The relationship between the implementing agency and the local residents was a difficult one at the beginning of the project implementation, because of the reasons such as the implementing agency tried to control trees planted in private land. At that time the implementing agency found it difficult to have the cooperation from the people for the project implementation. However, by responding to the needs of the people by entry activities and improved the arrangement to support the people, the implementing agency improved communication and eventually had the cooperation from the people. It can be said as the lesson that the trust relationship between implementing agency and the people are important for the participatory projects, and they can nurture trust relationship by promoting understanding needs of each other and willingness to compromise.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1.Project Outputs	Please refer to Tables 10 and 11	Please refer to Tables 10 and 11
2.Project Period	ID-P132 December 1997- February 2003 (63 months) ID-P146 March 2003 - March 2007 (49 months)	ID-P132 December 1997 - February 2003 (63 months) ID-P146 March 2003 - March 2010 (85 months)
3.Project Cost		
Amount paid in Foreign currency	0 million yen	0 million yen
Amount paid in Local currency	13,437 million yen (Local currency)	13,261 million yen (Local currency)
Total	13,437 million yen	13,261 million yen
Japanese ODA loan portion	11,247 million yen	10,997 million yen
Exchange rate	1 rupee = 2.45yen (As of September 2002)	1 rupee = 2.55yen (Average between 1997 and 2010)