

Republic of the Union of Myanmar

The Project for the Afforestation in the Dry Zone

External Evaluator: Jun Totsukawa, Earth and Human Corporation

0. Summary

The Project was to promote greening in the Central Dry Zone in the Republic of the Union of Myanmar (hereinafter referred as Myanmar) through planting of multipurpose forest. This objective was relevant with Myanmar's development plan and needs at the time of planning and is still relevant at the time of ex-post evaluation, therefore the relevance of the Project is high.

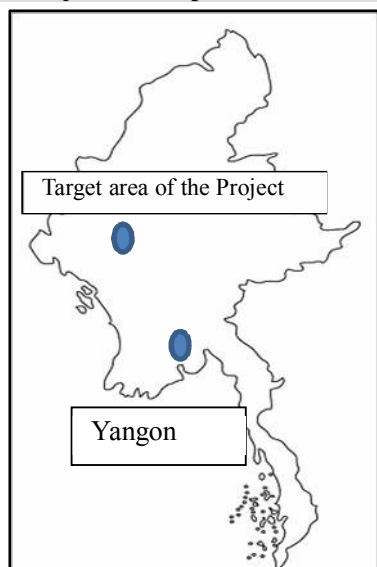
Afforestation has been carried out as planned in protected forest, fuel wood forest and community forest, and the trees planted in the afforestation sites have reached to the level that can be recognized as forest both in terms of survival rate and vegetation coverage. Moreover, the roads developed for the implementation of the Project are still maintained by local residents and have generated various positive impacts such as revitalization of traffic within the region and creation of tourism and retail businesses that followed. In light of the above, the Project's effectiveness and impact are evaluated to be high.

On the other hand, planting of the grazing forest was not carried out by the Myanmar side because the area of sites where trees could be planted was reduced. However, the roles expected of the grazing forest are mostly fulfilled by the large-scale fuel wood forest and community forest that were developed in the Project. Although the Project cost covered by the Japanese side was kept within the budget, the Project period slightly exceeded the original plan. Therefore the overall efficiency of the Project is evaluated to be moderate.

As for the sustainability, the Village Committee that consists of local residents still exists in the target area and the structure of the Nyaung Oo Office has been consolidated. Some village residents have also been hired as forest guards. Thus the administration system has been further improved since the time of project planning. Therefore the sustainability is evaluated to be high.

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

1. Project Description



Project Location



Afforestation area (Letpande Village)

1.1 Background

Myanmar, where forest occupies about 50% of the national land, depended on fuel wood for about 80% of domestic energy consumption (2002). However, due to excessive timber harvesting for export and household use (such as fuel wood), decreased the forest resources and caused such serious issues as soil erosion and land devastation. As demand for fuel wood increased with population growth, forest area had been significantly decreased, especially in the Central Dry Zone on the eastern side of the Arakan Range, where about 1/3 of the total population resides. On the other hand, as the zone is extremely dry that the average precipitation over the 10 years from 1987 to 1998 was only 568 mm/year, such harsh natural environment made it difficult for lost forest to recover through natural regeneration.

Therefore, having recognized the necessity to promote forest preservation and greening in the Central Dry Zone, the government of Myanmar carried out planting in an area of about 210,000 ha in the three years from 1994 and established the Dry Zone Greening Department (hereinafter afforestation techniques required in the zone. The government also established the Dry Zone Greening 5-year Plan, including a plan to conduct tree planting in about 40,000 ha by Fiscal Year 2005. Thus the government further promoted its greening program.

However, due to the severe natural environment and other conditions, it was technically difficult to expand afforestation in the Central Dry Zone. Therefore, the government of Myanmar requested the government of Japan to carry out an afforestation project in the Myethindwin Protected Public Forest Area in the Nyaung Oo District, the Mandalay Division, that could be a technical model for the expansion of afforestation in the Central Dry Zone.

1.2 Project Outline

The project is to promote greening in the Central Dry Zone of Myanmar through afforestation of multipurpose forest.

Grant Limit / Actual Grant Amount	[Limit] 1,508 million yen/[Provided amount] 1,453 million yen Term 1/5: 480 million yen/ Term 1/5: 469 million yen Term 2/5: 344 million yen/ Term 2/5: 335 million yen Term 3/5: 293 million yen/ Term 3/5: 288 million yen Term 4/5: 330 million yen/ Term 4/5: 300 million yen Term 5/5: 61 million yen/ Term 5/5: 61 million yen	
Exchange of Notes Date	Term 1/5	Sep 30, 2002
	Term 2/5	Jul 9, 2004
	Term 3/5	Jun 27, 2005
	Term 4/5	Aug 17, 2006
	Term 5/5	Jun 28, 2007
Implementing Organizations	Dry Zone Greening Department (DZGD)	
Project Completion Date	August 2008	
Practitioners	Main	Hazama Corporation
	Consultant	Kokusai Kogyo Co., Ltd.
Basic Design	May 2001 – March 2002	
Related Projects (if any)	Community Forestry Training and Extension Project in Dry Zone (2001-2006)	

2. Outline of the Evaluation Study

2.1 External Evaluator

Jun Totsukawa, Earth and Human Corporation

2.2 Duration of Evaluation Study

The External Evaluator performed an evaluation study as follows in the course of this ex-post evaluation:

Duration of the Study: November 2012 - August 2013

Field Survey: December 5-15, 2012, and May 12-23, 2013

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

3.1 Relevance (Rating: ③²)

3.1.1 Relevance with the Development Plan of Myanmar

(At the time of planning)

In response to the discussion at the United Nations Convention to Combat Desertification (UNCCD) in 1997, the government of Myanmar established an action plan for the forestry sector, which stated the promotion of systematic afforestation in the Central Dry Zone as one of the priority items as well as enhancement of natural forest preservation and promotion of forest management by local people's organizations.

In line with the action plan for afforestation of the Central Dry Zone, in 1997, the government announced the Dry Zone Greening Policy and established DZGD in the Ministry of Forestry as an organization to implement the policy. With six priority points³, the policy declared sustainable utilization of forest resources in the Dry Zone.

As the contents of the Project directly contribute to the promotion of greening of the Central Dry Zone, it is evaluated to be relevant to the policies of the government of Myanmar.

(At the time of ex-post evaluation)

At the time of ex-post evaluation, the Dry Zone Greening Policy is still considered as a fundamental policy to promote greening in the Central Dry Zone. The Dry Zone Greening Program defines a master plan for six terms of a total of 30 years starting with the 1st term from 2001 to 2006 and specifies afforestation sites and target area for future afforestation.

In light of the above, the afforestation efforts in the Central Dry Zone made by the Project were relevant to the national policies of the country and such relevance still remains at the time of ex-post evaluation.

The National Sustainable Development Strategy for Myanmar, established in 2009, also states that vegetation degradation is the most serious in the Central Dry Zone among the nation and that it is important to make efforts for preservation and recovery of vegetation in the zone. It also states that greening of the Central Dry Zone is also important in terms of carbon dioxide absorption (a measure to mitigate climate change).

In light of the above, the Project was not only relevant to the development policies of Myanmar at the time of Project planning but also remains important at the time of ex-post evaluation, considered one of the propriety projects of the country.

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

² 3: High, 2: Fair, 1: Low

³ 6 priority points: 1) Biodiversity protection, 2) Sustainable utilization of forest resources, 3) Securing of commodities for living such as fuels and foods, 4) Establishment of effective methods to draw out the economic potential of forest resources, 5) Establishment of resident participation, and 6) Promotion of understanding of the residents

3.1.2 Relevance with the Development Needs of Myanmar

(Development needs at the time of planning)

The government of Myanmar established the Dry Zone Greening 5-year Plan, including a plan to plant trees in about 40,000 ha from FY2001 to FY2005. The target of the overall plan was to plant trees in an area of about 210,000 ha in the Central Dry Zone in the 30 years from 2000 to 2030.

However, afforestation efforts in the Central Dry Zone had only been made in the areas where tree planting was relatively easy, and, in the areas with harsh environment where afforestation was more urgently required, only small-scale experimental afforestation had been conducted. Therefore, it was considered necessary to implement an afforestation project that would be a model for the future expansion of afforestation in the Central Dry Zone.

Moreover, although the personnel of the Ministry of Forestry had a good knowledge of forestry practice, participatory approach for forest management was limited, which were supposed to promote further. There was a high need to acquire skills for effective implementation of such forest management.

In light of the above, the Project is considered to have been relevant to the development needs of the target area and the counterparts.

(Development needs at the time of ex-post evaluation)

Based on the Dry Zone Greening 5-year Plan, DZGD planted trees in an area of about 85,000 ha in the 10 years from 2001 to 2010. Based on the plan, they plan to continue to plant trees in an area of about 120,000-140,000 ha in the remaining 20 years or so. At the time of ex-post evaluation, only a third of the period has passed and greening efforts in the Central Dry Zone are still on the way.

In light of the above, it is considered that the afforestation program in the area has not changed since when the Project was implemented and there is still a high need.

Table 1: Planned and Actual Area of Afforestation (unit: 10K ha)

Year	2001 - 05	2006-10	2011-15	2015-20	2021-25	2026-30
Plan	4.27	3.50	3.50	3.50	3.50	3.50
Actual	4.53	3.98	-	-	-	-

Source: Materials from DZGD

Note: Only planned values for 2011 and later

The afforestation techniques of the Project, which were expected to be a model to be used in other areas, have already spread within DZGD and used for afforestation projects in other areas. Specifically, frequency of watering, size of planting holes, installation of fences to keep out animals, etc., are the areas where technical improvement is observed.

Thus it is confirmed that, both at the time of project planning and at the time of ex-post evaluation,

the Project was and is relevant to the needs of the government of Myanmar.

3.1.3 Relevance with Japan's ODA Policy

Since 1998, Japan has been expressing its intention to continue to support Myanmar mainly through projects in the field of basic human needs, in consideration of importance, benefits, etc., of the projects.

The Project was to improve the living environment of the residents in the Central Dry Zone and included some contents that would contribute to the improvement of the living standard of the residents, such as natural environment preservation and securing of fuel wood forest and other types of forest for livelihood through afforestation.

In light of the above, the implementation of the Project was decided based on the aid policy of Japan and the Project was relevant to the policies of Japan.

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

3.2 Effectiveness⁴ (Rating: ③)

3.2.1 Quantitative Effects

The forest area, which was the indicator to measure quantitative effect of the Project, undoubtedly increased.

The following table shows the result of the vegetation survey of the afforestation sites conducted in the ex-post evaluation.

⁴ Effectiveness should be judged in consideration of impact to determine a rating.

Table 2: Forest Area Increased through the Project

	2001 (At time of planning)	2013 (At the time of ex-post evaluation)			Remarks
	Afforestation on area (Planned)	Afforestation area (Actual values)	Survival rate	Vegetation coverage	
Protection forest	Approx. 750ha	Approx. 734ha	74%	49.3%	The afforestation sites meet the forest definition and are recognized as forest.
Fuel wood forest	Approx. 720ha	Approx. 720ha	78%	47.5%	The afforestation sites meet the forest definition and are recognized as forest.
Grazing forest	Approx. 480ha	-	-	-	Afforestation has not been conducted.
Community forest	Approx. 65ha	Approx. 65ha	50%	21.3%	The afforestation sites meet the forest definition and are recognized as forest.

Source: Vegetation survey in the ex-post evaluation

The ex-post evaluation team conducted vegetation survey in a total of 30 plots (20 m x 20 m each) in the same method as DZGD conducts vegetation survey. DZGD's criteria for forest are 1) there is a block of 0.5 ha or more, 2) there is no land use for other purposes including agricultural use, and 3) canopy coverage is 10% or more. As all the plots of the target area of the Project have a total afforestation area of at least 10 ha and do not include any farmland, it meets the criteria 1) and 2). As the result of vegetation survey showed that the average survival rate was 72.7% (out of the 861 trees planted in the target plots, 626 survived) and the average vegetation coverage was 42.8%, it also meets Criteria 3. Therefore, it is confirmed that the trees in the afforestation sites of the Project have grown to the extent that they can be called forest.

Although the Myanmar side was supposed to plant trees in a grazing forest after the completion of tree planting by the Japanese side, it has not been taken place. The major reasons are as below.

The target area of the Project is called the Myethindwin Protected Public Forest Area, where many residents live and do farming. In the Project, the Myanmar side and the Japanese experts selected afforestation sites in the presence of the village chiefs and residents at the time of the basic design

study. However, after full-scale tree planting started, many people claimed land ownership⁵. Therefore, the Ministry of Forestry reselected afforestation sites, and, after removing all farmland including potential farmland, the protected area decreased to 1,857 ha. (The area was calculated to be about 6,390 ha at the time of basic design.)

The biggest factor that caused so many people to claim land ownership was probably lack of maintenance of the cadaster. It is presumed that, for some plots, the cadastral map was not consistent with the actual ownership status or no land ownership information was shown.

As the area of the afforestation sites covered by the Japanese side was about 1,500 ha, the remaining area for afforestation became about 350 ha and it was just a collection of tiny pieces of land that were not suitable for glazing land where a certain size of land is required. Therefore, planting of glazing forest was not carried out.

Although it was a negative factor in terms of forest area that the Myanmar side did not carry out planting of glazing forest, it was confirmed that large-scale fuel wood forest and community forest fulfilled the functions of glazing forest as residents are allowed to use undergrowth. Therefore, in terms of appearance of effect intended by the Project, it is considered that the desired level has been achieved. As will be described in the section about impact, local residents recognize that glazing has become easier.

3.2.2 Qualitative Effects

The Project aimed to “establish the operation and maintenance system for the afforestation sites” through the technical assistance, which is called as the “soft component” of the Project, as a qualitative effect⁶.

For the establishment of the operation and maintenance system, concrete outputs were defined as follows.

- a) An action plan for operation and maintenance of fuel wood forest and protection forest is established and carried out properly.
- b) Community forest is developed and maintained properly.
- c) DZGD personnel and residents learn skills for proper maintenance of fuel wood forest, protection forest and community forest.
- d) Demand for forest resources (fuel wood forest) decreases.

The action plan mentioned in a) was established and implemented at the time of soft component implementation after many discussions and workshops with residents. The major action was the

⁵ For the same reasons, the afforestation area of protection forests in Zio Village, where planting was carried out in Term 4/5, became slightly smaller than the original plan. However, the planned number of trees was planted with slightly smaller tree spacing. Therefore, it resulted in no difference in the effect of the Project.

⁶ In the Project, Japanese consultants were dispatched from Term 1/5 to Term 4/5 to provide technical assistance as soft component of the Project (a total of about 32 man-months). Similar technical support was provided in all the 8 villages in the target area of the Project as soft component.

establishment of rules for maintenance and use of fuel wood forest and protection forest and thorough enforcement of the rules. So far, there has been no such violation as logging or use of trees as feed. (Use of undergrowth in fuel wood forest is allowed.)

The community forest described in b) is also maintained by the residents. The local user group formed at the time of the implementation of soft components and the committee that played the central role in the group still exist and organize pruning in the community forest as well as serve as contact when DZGD and other external parties visit the area.

As for the skill acquisition by the DZGD personnel described in c), DZGD personnel took the initiative in holding a workshop during the implementation of soft components and coordinated views with residents when preparing the action plan. It is considered that they have obtained skills through a lot of experience in the field. As for the current activities, as afforestation projects with participatory approach are carried out as DZGD's own activities, it is considered that the acquired skills have been handed down and utilized. The details will be discussed in the section of sustainability.

As for the decrease in demand for fuel wood, the demand for forest resources has decreased in the whole area along with the decrease in household consumption and number of sugar palm farmers. (See the Impact section for details.) Gradually increasing use of improved cooking stoves and crop residue also contributes to the decrease in demand.

In light of the above, the planned effects have mostly been produced through the implementation of the Project and the effectiveness of the Project is high.

3.3 Impact

3.3.1 Intended Impacts

The implementation of the Project generated various impacts. First, we discuss the status of indirect impacts envisioned at the time of basic design. In the ex-post evaluation, we conducted a beneficiary survey to assess the status of impact generation⁷.

(1) Prevention of Soil Erosion

The majority of the residents in the target area considers the number of road closures due to soil erosion decreased after the implementation of the Project.

⁷ Beneficiary survey was conducted with a questionnaire with local residents in all the villages with afforestation sites -- Myethindwin, Letpande, Weltu, Nyaunggyi, Zio, Indaing, Yanzan and Aungtha. The total number of samples was 100. (13 from the 4 villages with community forest and 12 from the 4 other villages with other types of forests -- a total of 100 samples)

Table 3: Recognition of the Number of Road Closures due to Soil Erosion

	Significantly decreased	Somewhat decreased	Almost the same	Rather increased	Not sure	Total
No. of responses	21	56	13	8	2	100

Source: Result of beneficiary survey

(2) Securing of Life Resources

(a) Fuel Wood

Over 80% of the respondents said it became easier to obtain fuel wood after the implementation of the Project. The reasons for this are increase in fuel wood supply in the target area and decrease in the total quantity of fuel wood used at households.

Table 4: Recognition of Difficulty to Obtain Fuel Wood

	Much easier	Somewhat easier	Almost the same	More difficult	Not sure	Total
No. of responses	41	40	17	2	0	100

Source: Result of beneficiary survey

Table 5: Household Use of Fuel Wood

	Significantly decreased	Somewhat decreased	Almost the same	Increased	Not sure	Total
No. of responses	16	25	57	2	0	100

Source: Result of beneficiary survey

The 41 respondents who selected “Significantly decreased” or “Somewhat decreased” cited as reasons increase in the use of crop residue (39), use of improved cooking stove (17), lessened need for fuel wood for winter heating with the increase of clothes (39), and tightened utilization rules (24) (multiple answers allowed). Increase in the use of crop residue and improved cooking stoves is especially the result of the soft components of the Project and the subsequent follow-up activities by DZGD.

Another important background factor concerning fuel wood is recent change in economic activities in the target area. Palm sugar production has been a major industry in the target area and one of the important income sources. However, mainly due to recent market slump, the number of

sugar palm farmers have dropped to about half of 10 years ago (estimate from interviews in the village). It is said that palm sugar production needs about five times more fuel wood than domestic use as it has to be cooked for a long time, and the decrease of palm sugar production had the direct effect of significantly decreasing the fuel wood demand in the whole area. Such background is probably one of the reasons many people said it became easier to obtain fuel wood.

(b) Building Materials

The trees planted in the target area have not been used as building materials because they have not grown to the size of timbers that can be used for that purpose.

(c) Grazing Forest

The grazing forest and community forest are also open to the local residents for such purposes as using undergrowth if they do not cut branches. Therefore, although planting of grazing forest was not carried out, there are an increasing number of choices in terms of places for grazing and many residents say glazing became easier than before.

Table 6: Recognition of Easiness of Grazing

	Much easier	Somewhat easier	Almost the same	More difficult	Not sure	Total
No. of responses	40	35	14	4	7	100

Source: Result of beneficiary survey

It is probably related to the increase of options for grazing places; most people said that they saw a drop in the number of food crop damages (feeding damages) by livestock in the target area. (84% said feeding damage decreased.)

(3) Promotion of the Dry Zone Greening Plan in the Surrounding Area

The heavy machinery procured in the Project is used in Mandalay region and contributes to the expansion of afforestation area in the region. The back hoe and the bulldozer were kept at the Nyaung Oo Office and other trucks and tractors are kept and maintained at the DZGD headquarters in Mandalay.

3.3.2 Other Impacts

(1) Impacts on the natural environment

The result of the beneficiary survey shows that the majority of the residents think the number of

small animals (rabbits, wildcats, squirrel, etc.) and birds has increased. (76% said the number of types and population “significantly increased” and 14% said “somewhat increased”.)

There has been no large-scale forest fire.

(2) Land acquisition and resettlement

The implementation of the Project did not require any resident relocation or land acquisition.

(3) Other Indirect Impacts

(a) Economic Impact of Road Improvement

In the Project, road improvement including increase of width was conducted. This made it much easier to travel among villages and to Nyaung Oo, a nearby major city, and the roads are still maintained by local residents.

This road improvement has created business opportunities in several target villages as well as activated the economic exchanges in the region. A typical example is a case of ecotourism in Zio Village, which has grown so much that an average of over 50 tourist groups from home and abroad visit the village every month. (Zio has a giant tamarind tree that is a big tourist attraction.) Donation from tourists is used to repair temples and schools in the village. In Wetlu and other villages bordering on other villages, residents have started selling fuel for motorcycles on the street side.

(b) Use of Water Supply Equipment

The water supply equipment installed for afforestation is still operated and maintained by the residents even after the completion of the Project and is used when water shortage becomes serious in a dry season (in Letpande and Myethindwin). However, as the water rate is a little high to cover operation and maintenance cost, the water equipment is not used much in other seasons.

(c) Other Benefits

The following table shows the responses of the beneficiaries about the effects of the Project implementation. (Multiple answers were allowed.) Local residents recognize positive impacts of the Project implementation, e.g., “The relationship with the Ministry of Forestry improved” (it was pointed out that there was emotional distance between the residents and the ministry because quota used to be imposed to each village in some afforestation projects before) and “It led to support from other donors.” The residents also consider it a large impact that during the Project implementation local residents were hired for planting and a precious opportunity for employment was provided.

Table 7: Other Benefits of the Project

	Increased vegetation (shading and affiliation effects)	Increased rainfall	Improved roads	Creation of job opportunities (ongoing)	Better relationship with the Ministry of Forestry	Led to support from other donors
No. of responses	98	88	97	100	97	90

Note: Multiple answers from 100 respondents

: The question about the relation between increased forest area and rainfall was to ask the perception of local residents.

Source: Result of beneficiary survey

On the other hand, although no significant negative impacts were pointed out, some respondents to the beneficiary survey think the opportunities to sell fuel wood had decreased (10 respondents of Letpande and 4 of Indaing). However, it is also confirmed that fuel wood sale is for additional income and it does not have such a large impact to threaten their livelihood.

In light of the above, this project has largely achieved its objectives, therefore its effectiveness and impact is high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The following table shows the comparison between planned outputs and actual outputs.

Table 8: Comparison of Planned Outputs and Actual Outputs

	Plan	Actual
Afforestation area	• Approx. 2,000 ha	• Approx. 1,500 ha
	• The Myanmar side was supposed to carry out planting in approx. 500 ha after the completion of the afforestation by the Japanese side.	• The Myanmar side has not conducted planting in 500 ha of a grazing forest. • Afforestation has been completed in protection forest, fuel wood forest and community forest, where the Japanese side was in charge.

	Plan	Actual
Construction of administration facilities	<ul style="list-style-type: none"> Administration and extension office (64 m², 1 location) Workshop (70 m², 1 location) Water supply equipment (2 sets of a well and an elevated water tank) 	<ul style="list-style-type: none"> Same as on the left
Improvement of equipment for land development and maintenance of afforested area	<ul style="list-style-type: none"> A total of 24 types of equipment for land development including 4-ton trucks, backhoes and tractors A total of 13 types of equipment including meteorological observation units and portable wireless communication units 	<ul style="list-style-type: none"> Same as on the left

Source: Materials from JICA

3.4.2 Project Inputs

3.4.2.1 Project Cost

Given below are the planned and actual project costs of this project. The project cost was lower than planned.

Table 9: Planned and Actual Project Costs

	Main cost		Total project cost
	Japan side:	Myanmar side:	
Plan	1,508 million yen	5 million yen	1,513 million yen
Actual	1,453 million yen (96% of the planned amount)	4 million yen (80% of the planned amount)	1,457 million yen (96.2% of the planned amount)

Source: Materials from JICA and DZGD

The main cost for the Project was smaller than the planned amount because of the review of labor cost and air-fare and also the difference between bids and planned prices. The cost to be covered by the Myanmar side was within the planned amount as the workshop cost and the document preparation cost were slightly smaller than the plan.

According to the plan, the Japanese side was to cover the cost for a) tree planting, b) construction of forest administration facilities, c) improvement of equipment for forest development and management of afforestation sites, and d) technical support concerning the formulation of a participatory plan for afforestation land development and maintenance, and the Myanmar side was to cover the cost for a) workshop, b) document preparation, c) dispatch of personnel, d) labor cost, and

e) miscellaneous expenses. There was no change with the cost sharing arrangements. The cost covered by the Myanmar side does not include the project cost for grazing forest.

3.4.2.2 Project Period

The project was slightly delayed in some phases due to weather conditions, slight delay in the supply of seedlings, extra time required to hire staff for planting work, etc. Therefore, the total project period slightly exceeded the planned period.

Table 10: Planned and Actual Project Period

Plan	Result
63 months	64.9 months (103% of the planned period)

Source: Materials from JICA

In light of the above, the project period slightly exceeded the plan although the project cost was within the plan. Therefore, the efficiency of the Project is fair.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The Central Committee and the Township Control Committee, which were established at the time of the Project implementation, still hold regular meetings with the same members at the time of the ex-post evaluation⁸. The Village Committee, which was expected to play the most important role in the operation and maintenance of the target area of the Project, still exists in each village and is playing a central role in forest operation and maintenance. During the implementation period of the Project, meetings of the Village Committees were held at the Nyaung Oo Office, but are now held in each village about every two months with the attendance of the range officer from the DZGD Nyaung Oo Office.

It is also considered that the structure of the DZGD Nyaung Oo Office has been developed almost well enough for the operation and maintenance of the target area. At the time of the ex-post evaluation, the office maintains almost the same number of staff as during the Project implementation period, with the director, officers at the top, and range officers, foresters, etc. assigned to each area. In addition, five village residents are employed as forest guards as manpower to supplement daily forest management (as of March 2013). Especially in a dry season, four more village residents are employed as contract workers. Thus the structure to prevent forest fire has been

⁸ The Central Committee is considered as an organization to supervise maintenance headed by the DZGD director. The Township Control Committee is headed by the director of the Nyaung Oo Office and conducts monitoring and patrolling.

developed.

In light of the above, both the structure of the government and that of the residents have been developed well enough for the maintenance and management of the target area of the Project.

3.5.2 Technical Aspects of Operation and Maintenance

As for the skill level of the DZGD personnel, almost all members have graduated from the Institute of Forestry and have acquired overall skills in forestry. Many of foresters have also studied at a forestry school. Thus, generally there is no problem with their skills in forestry.

Forest management with participatory approach has been spreading for the last decade or so and the forestry school has a course concerning such forest management. Actual experience in forest management with participatory approach is also being gained. The Nyaung Oo Office holds environmental preservation workshops for local residents and the office staffs serve as workshop coordinators.

Thus they are making efforts for forest management through dialogue with local residents, and it is considered that the skills for the participatory forest management have reached the level where sustainability can be achieved.

[Reference]

In 2009, after the completion of the Project, DZGD started an afforestation program called “1-village 1-acre Program”, for afforestation under the ownership of the residents. In this program, selection of tree types and maintenance are conducted with the concept of residents’ participation and initiative while DZGD supplies seedlings and provides technical support, and there is a system where plantation care groups consisting of residents carry out maintenance activities. Through the program, 50 ha has been afforested for the last about three and a half years and the number of target villages will be increased in the future. This is a good example to show how DZGD’s participatory approach has spread.

3.5.3 Financial Aspects of Operation and Maintenance

The vegetation condition in the target afforestation area of the Project has already passed the stage when feeding damage or withering can be a threat for sustainability. Therefore, the major expense required is for the employment of forest guards to prevent such accidents as forest fire. As stated earlier, judging from the fact that employment of local residents has been increased, such budget is likely to be secured. Although the DZGD Nyaung Oo Office does not have a mid-long term employment plan of village residents as forest guards, considering that six village residents are now employed as forest guards at other projects’ sites, it seems that DZGD puts importance on the resident forest guards as an effective form for patrol and maintenance.

3.5.4 Current Status of Operation and Maintenance

As stated in the sections of effectiveness, etc., the planted trees in the target have been growing well and the vegetation coverage rate meets Myanmar's forest criteria. The area is also maintained in good conditions without large forest fire or any such other incidents.

The equipment (such as backhoes and bulldozers) procured through the Project are still effectively used. Cutting edge and cutting blade for bulldozers have been replaced with spare parts and they are maintained in good conditions⁹.

In light of the above, 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

The Project was to promote greening in the Central Dry Zone of Myanmar through afforestation of multipurpose forest. This objective was relevant with Myanmar's development plan and needs at the time of planning and is still relevant at the time of ex-post evaluation, therefore the relevance of the Project is high.

Afforestation in protection forest, fuel wood forest and community forest was carried out as planned, and the trees planted in the target area have grown to the level that can be recognized as forest in terms of both survival rate and coverage rate. The simple roads developed for the implementation of the Project are still maintained by local residents and have generated various positive impacts such as encouragement of traffic within the region and creation of tourism and retail businesses that followed. In light of the above, the Project's effectiveness and impact are evaluated to be high. On the other hand, the Myanmar side did not plant trees in grazing forest because the area available for planting within the target area was reduced. However, the roles expected of the grazing forest are mostly fulfilled by the large-scale fuel wood forest and community forest developed in the Project. The overall efficiency of the Project is evaluated to be moderate because the Project period exceeded the original plan although the Project cost covered by the Japanese side was kept within the budget.

As for the sustainability, the Village Committees that consist of local residents still exist in the target area and the structure of the Nyaung Oo Office has been consolidated. Some residents of the village have also been hired as forest guards. Thus the structure for maintenance has been further improved since the time of project planning and the sustainability is evaluated to be high.

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

⁹ The equipment (such as backhoes and bulldozers) provided through the Project was required for the implementation of the Project, and not for the future maintenance of the afforestation sites. It is preferable that the equipment would be used for afforestation projects in other areas controlled by DZGD.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Some of the planting techniques introduced in the Project can probably be used in other areas (e.g., 1. proper watering method and frequency in dry season, 2. installation of fences to keep animals out, and 3. appropriate size of planting holes). It is important to further spread such techniques to afforestation projects in other areas in the Central Dry Zone.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Although the Japanese side carried out planting as planned, the Myanmar side was not able to carry out planned planting because they could not get land. We can learn the following lessons to avoid such situation in the future.

1. Necessity of Land Registration Confirmation

In the basic design study of the Project, proposed sites were selected in consideration of both natural and social conditions. To consider social conditions, sites were selected in the presence of the village chief and residents. However, after full-scale tree planting started, many people started to claim land ownership. Therefore, the Ministry of Forestry rearranged the sites and, after removing all farmland including potential farmland, the protected area became smaller than the area planned at the time of the basic design (no space left for a grazing forest). As a result, the Myanmar side did not carry out planting of grazing forest. The biggest reason for such situation was probably that the Myanmar side did not maintain accurate land registration and started the Project without checking it well. Although land registration requires lots of time and efforts, official land ownership situation has to be clarified before any planting project. The Japanese side should have communicated the importance of this to the Myanmar side when selecting planting sites.

2. Concept for Planning of Afforestation Area

In some cases where checking and verification of land registration cannot be completed in the planning phase, we have to decide the outline in the planning phase and finalize it during the project implementation. In such cases, it is preferable to keep the desired effects in mind, consider risk of reduction of area, and set a large area when planning.

3. Careful Examination of the Project Scope and the Implementation Plan the Government of the Recipient Country Should Have

The effect expected of the grazing forest was fulfilled by other types of forest. This is not an efficient input in terms of effect generation. It is necessary to carefully examine the appropriateness

of the scope (inputs) in the planning phase so that the desired effects will be generated.

In the Project, the planting of grazing forest was not listed in the project cost plan to be covered by the Myanmar side. In addition to the above-mentioned careful examination, it is also important to check and implement a project plan and budgets to make sure that the recipient country will carry out all the items as planned.