

Chapter 3 Project Evaluation and Recommendations

3-1 Effect of the Project

3-1-1 Target of the Project

The overall goal of the project is to improve residents' living environment by promoting greening in the Dry Zone, using the 2,000ha of afforested land in Myethindwin protected public forest as a model.

The target of this project is to establish the Multi-purposes forest (2,000ha) maintained as a greening model against desertification. The project includes various programs to support DZGD in establishing an effective forest management plan and to extend greening to other areas in the Dry Zone. The input by the Japan side consists of the planting of the protection forest and the fuel wood forest (1,500ha), the construction of facilities and the procurement of equipment necessary for O/M and supporting DZGD for Action Plan formation under soft component. The input by DZGD will be the establishment of the silvo-pastoral (500ha) and the Action Plan.

The output will be the completion of the Action Plan, sustainable management by DZGD and the afforestation of 2000 ha of land. This will contribute greatly to the solving some of the problems which resident are faced with such as soil erosion and a lack of supply of fuel wood, fodder and grazing land. The flow for input and output to be made by both sides and the project's target is shown on the next page. The expected benefits, such as protection against soil erosion, rehabilitation and maintenance of the natural environment and a supply of fuel wood and the absorption of CO₂, will be described in detail.

(Flow of input and out put, and Project Design Matrix for the project: refer to Figure 3.1 and Table 3.1.)

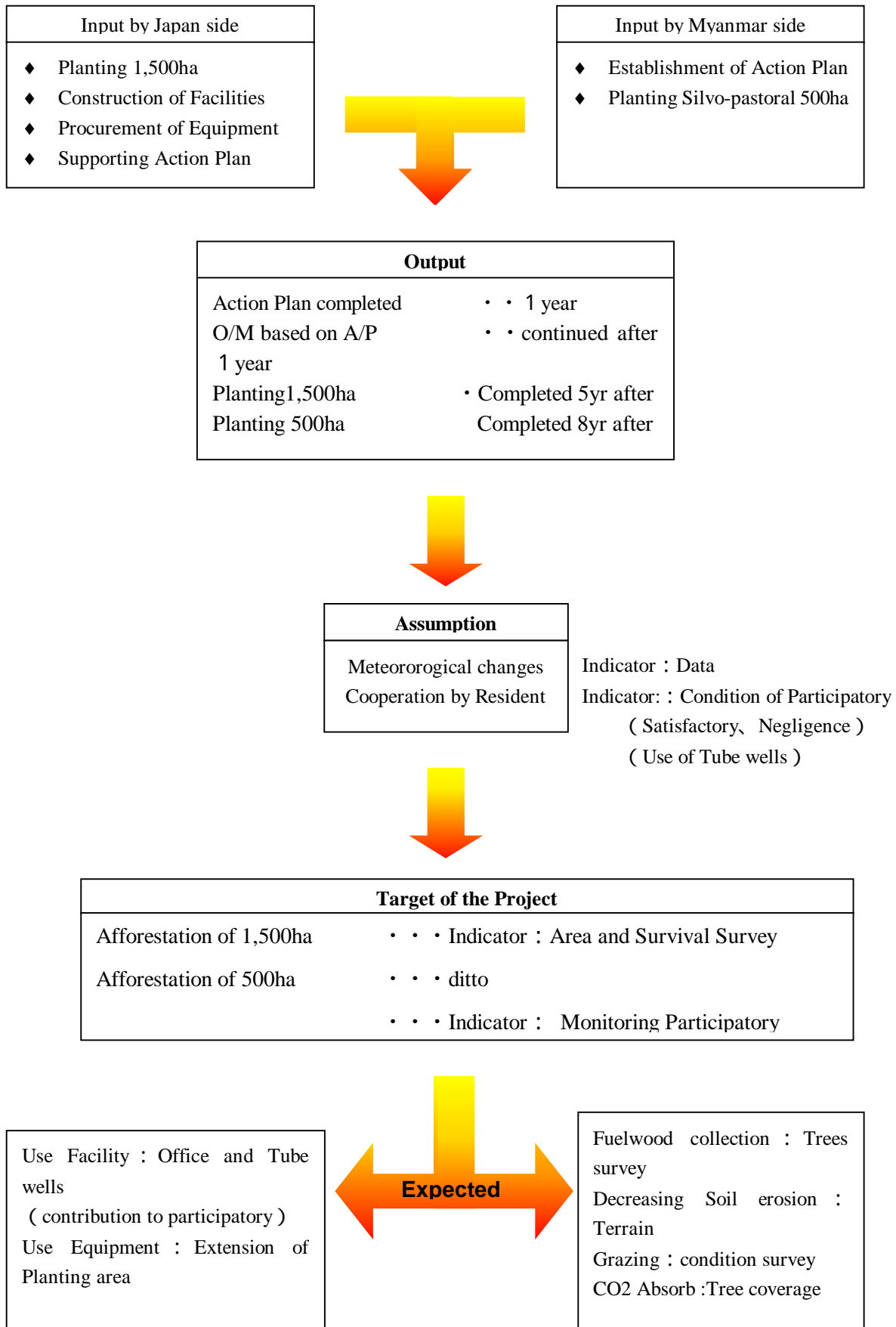


Figure 3.1 Flow for Evaluation

Table 3.1 Project Design Matrix

Name of the project : Project for the Afforestation in the Dry Zone in the Union of Myanmar

Term : 9 years from the beginning of the Project

Target area : Myethindwin Protected Public Forest Area Target group : Staff of DZGD and the people around the project site

March, 2002

Narrative Summary	Verifiable Indicator	Means of Verification	Important Assumptions
Overall Goal Resident living environment in the Dry Zone is improved by promotion of greening.	<ul style="list-style-type: none"> • GDP per capita in region is increased. • Economic contribution to residents by greening is increased. • Soil erosion is decreased. • Management activities, capacity building, research, etc. in DZGD and FD are improved. 	<ul style="list-style-type: none"> • Forestry and agriculture annual report • Survey of Social and economy in Region • Greening Annual plan 	<ul style="list-style-type: none"> • Importance of greening the Dry Zone recognized in central government policy • Other donors assistances for forestry continued • Forestry policy cooperated with social development policy
Project Purpose <ul style="list-style-type: none"> • Multi purpose forest of 2,000ha is established in Myethindwin protected public forest. 	<ul style="list-style-type: none"> • Growth of tree in Myethindwin is increased (CO₂ absorbed, carbon sinks) • Soil erosion in Myethindwin protected public forest is decreased • Fuel wood collection is controlled • Income of 7 villages in Target area is improved • Administration of DZGD and Nyaung Oo office is improved 	<ul style="list-style-type: none"> • Forest Survey of Myethindwin protected public forest • Survey of villages (family, income, farming, grazing, etc.) • Survey of agricultural products • Survey of land use (registered or non-registered) 	<ul style="list-style-type: none"> • Importance of management of the Dry Zone in forestry policy incorporated • Community forest successively approved • Resident participation successively obtained • Joint operation with other organization promoted (Land Registration clearly defined)
Output (Result) <ul style="list-style-type: none"> • Community forest of 65ha is established. • Multi purposes forest is established. • Action Plan is established and functioned in place. • Staff and residents acquires necessary skill and the skill is functioned in place. • Illegal logging is decreased. • Tube well is constructed. • Committee in each level is organized. • DZGD is strengthened. • Know-how of RRA is understood by DZGD • Knowledge of resident is improved. • Resident participatory is promoted. • Fuel wood supply is satisfied. (stove improved) 	<ul style="list-style-type: none"> • Coverage of Greening is maintained (Comm f, Multi f). • Nyaung Oo District Office is functioned. • O/M of Tube wells is well managed. • Activities of Committee is promoted. • RRA is applied. • Resident participation in management is increased. • Resident Lively-hood is improved. • Fuel wood consumption is decreased. 	<ul style="list-style-type: none"> • District office statistic data, report and plan • Project report concerned • Village development report • Management report of Afforestation 	<ul style="list-style-type: none"> • Abnormal meteorology never occurred • Endeavouring and cooperation by resident obtained • Endeavouring and cooperation by C/P obtained • Life for resident is stable
Activities <ul style="list-style-type: none"> • Planting area in Myethindwin protected public forest is selected. • Nursery and road construction is planned. • Tube well is planed. • Seedling practice plan is made. • Trench and pit preparation are planed. • Planting, Patching, excavating are planned. • Improvement of stove is planned. • Procurement of equipment is planned. • Training plan for staff and resident is made. • Village information is obtained. 	Input (Japan sides) <ul style="list-style-type: none"> • 1,500ha is planted. • Facilities(office, tube-well, nursery, etc) are constructed. • Equipment for O/M is procured. • Establishment of Action Plan is supported. (Myanmar sides) <ul style="list-style-type: none"> • The silvo-pastoral of 500ha is planted. • Action Plan is established. 	<ul style="list-style-type: none"> • Tax exemption is applied • Resident participatory is obtained • DZGD and resident are cooperative Pre-conditions <ul style="list-style-type: none"> • Japanese Grant aid is continued • Cooperative services by DZGD and resident are offered 	

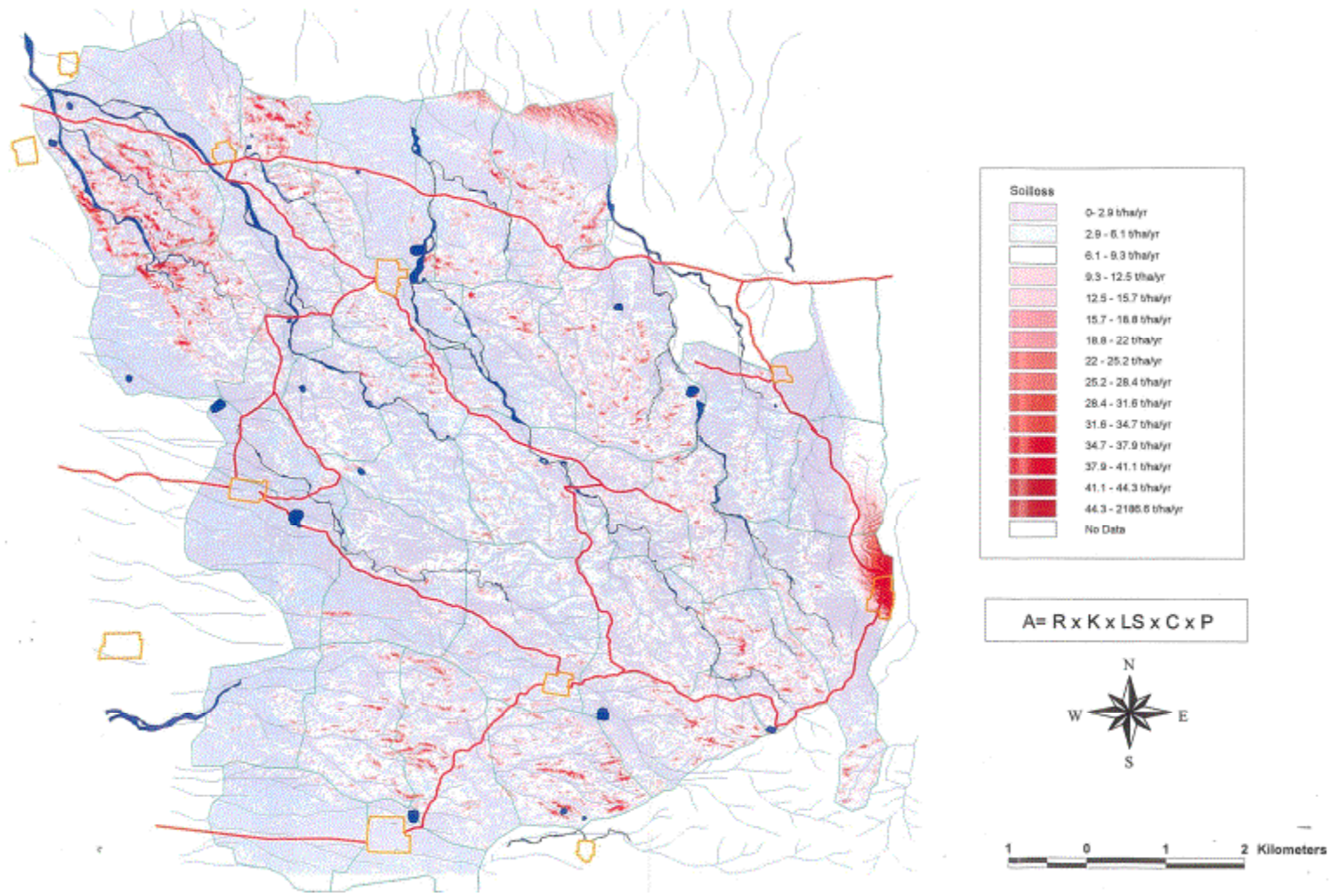


Figure 3.2 USLE Map

3-1-2 Expected Output

3-1-2-1 Protection against Soil Erosion

USLE (Universal Soil Loss Equation) indicates that at least 2.9 tons of soil per ha is eroded from most of the project area every year. This means that about 9,000 tons of soil is washed out from the candidate afforestation sites (about 3,000 ha). Soil erosion to the extent of 22-25 ton/ha/yr ~ 34.7-37.9 ton/ha/yr is recorded in 60 % of southern Nyaunggyi where the highest soil loss is in Myethindwin protected forest. Supposing the average soil loss is 30 ton/ha/yr, the soil loss of this project area would be in total 250 ha x 0.6 x 30 ton/ha/yr = 4,500 tons every year. Thus, USLE shows that a huge amount of soil is being lost in this region. Although afforestation will not stop soil loss immediately, it will surely reduce the rate of soil loss. The impact on the villages downstream and infrastructures (mainly roads) used by neighbouring towns and villages including Nyaung Oo township (beneficial residents are about 285,000) will surely be reduced. Accordingly, it will also provide a large benefit to the residents for commercial activities between Mandalay and Nyaung Oo/Bagan.

3-1-2-2 Guarantee of Livelihood Resources (Basic Needs)

Fuel wood, construction materials, grazing land and fodder are the livelihood resources obtained from the planting. In Myanmar, the annual growing stock in non-productive forest is 30m³/ha for broad-leaved trees and 10 m³/ha for mangrove forest. The rate is not at all high. Although there is no statistical data on tree growing in the Dry Zone, the annual growing stock rate is estimated to be 6.64m³/ha (refer to Table 3.5). The growing stock of 1,500 ha 10 years after completion of the project is estimated to be 105,000m³ in total.

(1) Fuel Wood Forest

Annual growing rate for planting trees will be estimated as follows:

Table 3.2 Annual Growing Rate

Species	Annual growing / ha
<i>Eucalyptus camaldulensis</i>	12m ³ / yr
<i>Leucaena glauca</i>	10m ³ / yr
<i>A.auriculiformis</i>	8m ³ / yr
<i>Albizzia lebbek</i> <i>Azadirachta indica</i>	6m ³ / yr
<i>Prosopis juliflora</i> <i>A.catechu</i> <i>Tamarindus indica</i>	5m ³ / yr

Note: Data source from Nigeria, Burkina Faso and Cote'd Ivoire.

1) Volume of Planted Trees in 5-7 years after planting

Volume of planted trees based on Table 2.15 will be estimated as follows:

Table 3.3 Annual Growing Rate after 5-7 years

Species	%	m ³ / yr• ha
<i>Eucalyptus camaldulensis</i>	4	0.48
<i>Leucaena glauca</i>	21	2.10
<i>Albizzia lebbek</i> <i>Azadirachta indica</i>	31	1.86
<i>A.catechu</i>	44	2.20
Mean average	100	6.64

The Planting rate except existing vegetation is estimated to be 65%/ha in the project site. As the existing vegetation consists mainly of shrubs, the growing rate in percentage is assumed as 80% for planting trees and 20% for shrubs. As for growing rate of 6.64m³/ha, volume will be $6.64\text{m}^3 \times 0.8 = 5.31\text{m}^3$.

Volume after 5-7 years will be estimated as follows:

Table 3.4 Volume after 5-7 years

(Planting area is 723ha)
unit: m³

	Annual volume	5 yrs	6yrs	7yrs
Expecting Volume	3,800	19,000	22,800	26,600

According to the criteria of Myanmar's Action Plan, 5 to 10 % of local resident's demands for fuel wood have to be planted as a duty. The growth rate of planting duty has to be over 1,074.8m³ because the demand in the target area was 21,496 m³ per year (see RRA). However, no tree planting has been carried out in the past and the gap with the demand has been widening. The planting for the fuel forest is planned about 723ha. The expected annual growth rate of the planting will be 5,061m³, which will satisfy as much as 18% of the demand (four times the annual criteria). After 6 years this will be expanded to 26,600m³, which meets the resident's demand. About 30,000 residents will be directly benefited in regards to fuel wood including neighbouring villages such as Kantayar, Nyaung Pinkan and Kabani.

Table 3.5 Residents of the Target villages

Myethindwin	Zio	Letpande	Aungtha	Wetlu	Nyaunggyi	Yanzan	Indaing	Chaukkan	Kantayar and other neighbouring villages
884	824	1,071	384	1,389	580	1,200	706	1,270	20,000

Source: Field Survey, DZGD

(2) Construction Use

Trees that are at least seven year old trees can be obtained from the Community forest for construction uses (depend on the user rule). Until now, there is no Community forest in terms of CFI in the project site. At present, trees planted by FD and DZGD are illegally cut down from their roots and used as construction material and fuel wood. This project will contribute to raising resident's awareness towards tree planting and reducing the illegal logging through the planting Community forest under CFI and extension activities.

(3) Silvo-pastoral

The present grazing land is as large as about 800 to 1,000 ha and sparsely used for collecting fuel wood. About 2,500 heads of cattle and about 2,000 goats are grazed in the area. In September and October at the end of the rainy season, the land is covered by grass such as Marvel grass, Red sprargletop, Nut grass and Goose grass, which usually grow in the Dry Zone. In the dry season, there is a little grass for pasture (only in valleys) and farmers feed their animals with husks of sorghum and sugar palm, which grow in the rainy season. By changing the present grazing land into the silvo-pastoral, the appropriate shadow and sunlight will preserve the pastureland and about 80 % of the local residents in the project site will directly benefit.

3-1-2-3 Expected Benefit from the Procured Equipment

The procured equipment, such as heavy machinery and vehicles, will contribute not only to the afforestation in the protection forest, the fuel wood forest and the silvo-pastoral totaling about 2,000 ha, but also to implementation of 1,800ha of the protection forest in Nyaung Oo Township and 10,000ha in Mandalay Division stated in the Integrated Greening Dry Zone 5 Year Plan. Therefore, the equipment cost (about 100 million yen) will be able to contribute to about 12,000 ha of afforestation.

Table 3.6 Population of the Dry Zone

	Mandalay	Magwe	Sagain	Total
Population	5,823,000	4,067,000	4,889,000	14,779,000

Source: DZGD in 1994

Table 3.7 Planting Activity Plan (Five-Year Plan)

Dry Zone Integrated Five-Year Plan	Planned area in Nyaung Oo district (ha)
2001 – 2002	453
2002 – 2003	405
2003 - 2004	324
2004 - 2005	322
2005 - 2006	324
Total	1,848

Source: DZGD

3-1-2-4 Establishment of O&M System for the Afforestation Sites (Support by Soft Component)

Without sustainable O&M, no benefit will be expected from the afforestation sites. Moreover, it could be faced with initial problem of desertification. It is important to establish an O&M system that enables the Nyaung Oo district office to manage the afforestation sites steadily in the future. Therefore, an Action Plan for the O&M on the afforestation sites for DZGD and Nyaung Oo District office will be inevitable. The Action Plan has to be formulated by the DZGD and the Nyaung Oo District office. The system of monitoring, evaluation and follow-up support has to be established. Under Myanmar's present system, efficient management is impossible, as staff of the middle and lower levels cannot take any action without orders from the top. The Action Plan will promote self-management by DZGD staffs and also build management capacity of the staffs. In addition, it will make clear not only management of personnel, budget and equipment but also information management of afforestation sites, nursery practice, planting and tending. A consultant will support DZGD for formulation and implementation of the Action Plan under the soft component. The direct effects will be expected as shown below.

Table 3.8 Output and Goal (Direct Effect)

Output (Direct Effect)	Goal
1-1 The DZGD establishes the Steering Committee for Operation and Maintenance.	The Action Plan for protection forest and fuel wood forest is formulated and adequately implemented.
1-2 The DZGD draw up the guidelines for utilization of the fuel wood forest based on residents' opinions obtained through workshops, and incorporate it in the Action Plan.	
1-3 The DZGD incorporate the plan for the management of the fuel wood forest formulated by the Village Level Operation and Maintenance Committee in the Action Plan.	
1-4 The DZGD's Action Plan is implemented.	
2-1 The DZGD explain the CFI to the residents.	Community forest is established and adequately managed.
2-2 DZGD and villages select the area for the community forest and form the user group.	
2-3 The residents establish the community forest.	
2-4 The residents operate and maintain the community forest.	
3-1 The DZGD formulate the operation and maintenance manual based on the participatory method.	DZGD staff establish a resident participatory management system and give residents adequate training.
3-2 Residents receive training on technical skills for nursery and planting work.	
4-1 The improved stove for household use is popularised.	The demand of forest resource is reduced.
4-2 Guidance is given on agroforestry.	

The effective management system will be established as shown below.

a) Information management

- ◆ Planting records such as nursery practice records, germination rate, seedling rate, survival rate and natural conditions (temperature, humidity and precipitation) will be reflected to the effective planting activities and nursery practice.
- ◆ A management system for data such as the number of local participants, planted species, the number of trees, locations and areas will be established and the planting management will be rationalized
- ◆ The records of trainees, training themes, periods and places will support the future activities of the trained staffs.

b) Training, instruction and enlightenment

- ◆ The functions and roles of the local offices and the national policy will be clearly understood by the local people.
- ◆ The technical levels of the staffs and local people will be improved.
- ◆ More occasions will be given for rangers to convey policies of the central government and function/roles of the local offices to the local people. Moreover, occasions of mutual cooperation will increase.

c) Planting activities

- ◆ The planting will be carried out by participatory system.
- ◆ Participant-based planting and self-management by the residents will be attained and illegal logging will be reduced.
- ◆ Water facilities will be improved and allow sustainable use.
- ◆ The natural environment will be maintained by the afforestation.

d) Activities of villages

- ◆ Detailed information on the activities of residents in each village will be collected.
- ◆ Occasions of cooperation between the government and residents will be promoted and face-to-face relationship will be established.

e) Capacity building and facility management

- ◆ Information will be exchanged between the central government and the local offices more frequently and each of them will be able to function efficiently.

- ◆ Self-management of facilities including maintenance of equipment by the district staffs will be established.
- ◆ Efficient operation and management system for vehicles will be established by formulating an operation plan.
- ◆ Technical and management capacity of the staffs will be improved, which enables to strengthen the organization and function efficiently.
- ◆ Variable information and data will be well managed and used efficiently for the technical matters, management and extension activities.

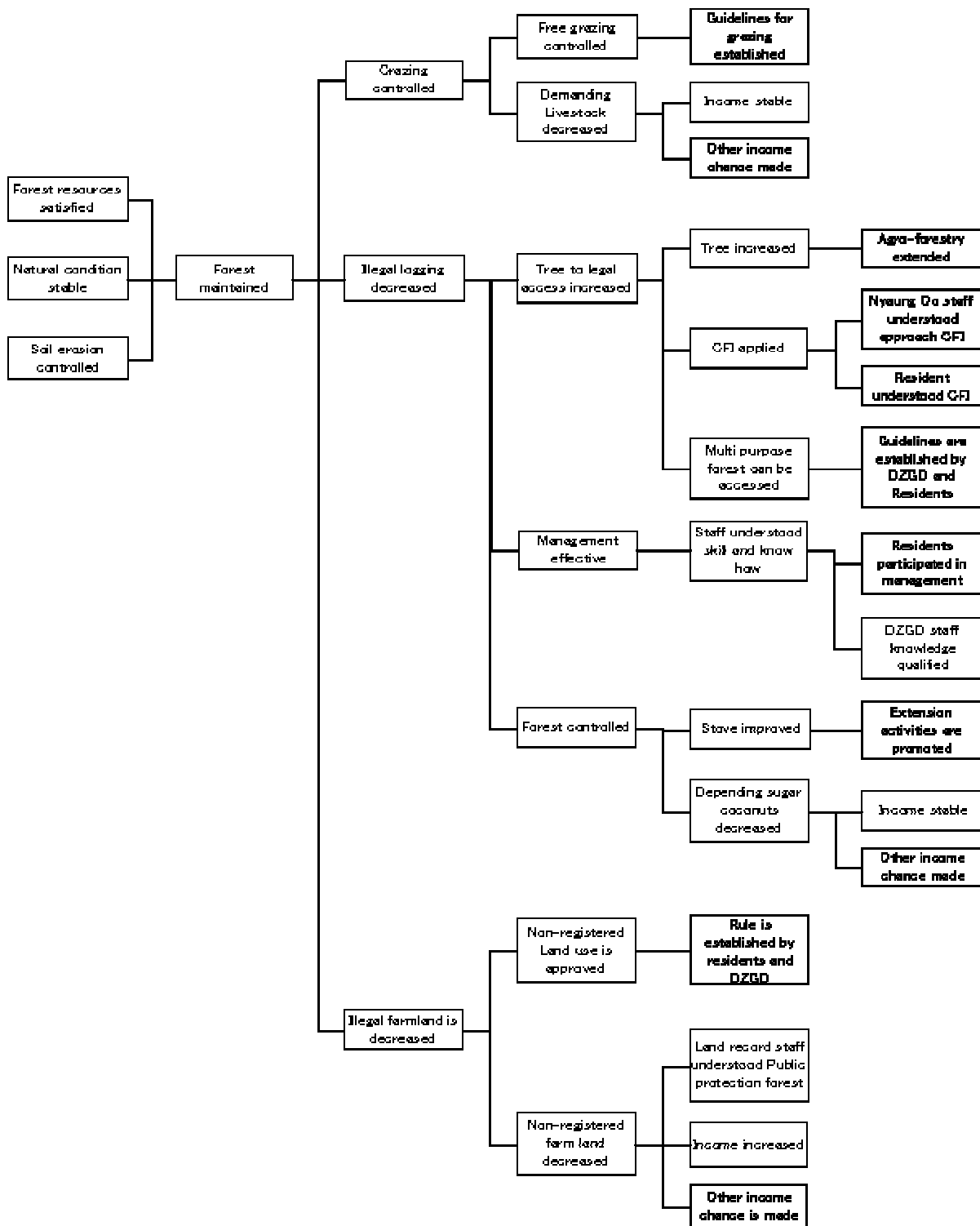


Figure 3.3 Objectives analysis

3-2 Subjects and Recommendation

3-2-1 Budget Allocation and Establishment of Funding

In order to allocate the actual budget necessary for sustainable O/M, DZGD has to convince the Finance Ministry of the benefits of the project obtained from afforestation. It is very important to manage the budget and activities come out from the framework of Action plan.

3-2-2 Management Committee

The establishment of the sustainable O&M system in the Ministry of Forestry will be big subject to promote and expand afforestation in the Dry Zone.

At present, Management Committees for afforestation that are aiming at sustainable O/M shall be established before the implementation of this project at all levels (DZGD, District and Township and Community). These Committees will be required to conduct monitoring and evaluation periodically in line according to the Action Plan and give appropriate indications to others. Nyaung Oo District office has to formulate an operation program through the year based on the Action Plan and be ready to cope with the instruction by the central DZGD. The DZGD also has to establish a system to monitor, evaluate and support for the District office from the central organization.

These Management Committees in DZGD will function to promote afforestation in the Dry Zone.

3-3 Evaluation

In 1997, in order to promote greening in the Dry Zone, the Greening Dry Zone Integrated Five-Year Plan was formulated and DZGD was established independently from the FD. DZGD has promoted greening in the Dry Zone based on four main activities: planting, the protection of natural forest, the promotion of use of alternatives to fuel wood and the development of water resources. This project aims to establish 2000ha of multi purpose forest in Myethindwin Protected Public Forest, which is the biggest protected forest in the Dry Zone and has been faced with serious problems of degradation of forest and land. If this plan is implemented, the following can be expected:

- ◆ The project beneficiaries will be 285,000 of the poor resident population.
- ◆ The 2000ha of the protection forest, the fuel wood forest, the silvo-pastoral and the community forest established under the project will sustain the community's livelihood resources and natural environment.
- ◆ Resident participation in forest management is expected as their opinions have been reflected in the type and scope of the forests to be planted.
- ◆ The equipment to be procured that not put burden on DZGD for their maintenance will directly contribute to the overall future greening plan in the Dry Zone.
- ◆ DZGD will be able to establish a sustainable resident participatory O&M system and promote its expansion (understanding of greening, participation in the management of multipurpose forest)
- ◆ The project will be an effective model to promote greening in the Dry Zone.

3-4 Conclusions

The Union of Myanmar has been a friendly country with Japan since achieving independence in the aftermath of the Second World War. Based on its great developmental needs, Myanmar had been given priority along with other Southeast Asian countries for assistance from Japan, while maintaining close and friendly relations. But Japan suspended its ODA to the Myanmar in principal since 1988 due to political upheaval. However, since the release of Mrs. Suu Kyi from house arrest in July, 1995, Japan has reviewed its policies and is now extending cooperation focusing on successive projects from past assistance and matters of basic human needs that will be of direct benefit to the people, while keeping a close watch over improvements in democratisation and civil rights.

The project is expected to have significant results as it will encourage the participation of about 30,000 residents and beneficiaries of approximately 280,000 residents by promoting afforestation activities along with the Integrated Greening Dry Zone Policy.

Furthermore, as Government agencies in Myanmar do not have experience with resident participatory management systems, assistance in the form of the soft component will be given to DZGD concerning forest management to ensure the effectiveness of the project.

Although the project targets the Nyaung Oo District office, the results are expected to spread throughout the Mandalay Division in future. Because of its considerable impact, the project is appropriateness for implementation under Japan's Grant Aid Program.