

**Republic of the Union of Myanmar
Ministry of Natural Resources and Environmental
Conservation**

**The Project
for
Capacity Building for Sustainable
Natural Resource Management**

Project Completion Report

July 2024

Japan International Cooperation Agency (JICA)

Table of Contents

	<u>Page</u>
I. Basic Information of the Project	1
1. Country	1
2. Title of the Project	1
3. Duration of the Project (Planned and Actual)	1
4. Background (from Record of Discussions(R/D))	1
5. Overall Goal and Project Purpose (from Record of Discussions(R/D))	2
6. Implementing Agency	2
II. Results of the Project	2
1. Results of the Project	2
1-1 Input by the Japanese side (Planned and Actual)	2
1-2 Input by the Myanmar side (Planned and Actual)	4
1-3 Activities	4
2. Achievements of the Project	7
2-1 Outputs and indicators	7
2-2 Project Purpose and its Indicator	11
3. History of PDM Modification	12
4. Others	13
4-1 Results of Environmental and Social Considerations (if applicable)	13
4-2 Results of Considerations on Gender/Peace Building/Poverty Reduction, Disability, Disease infection, Social System, Human Wellbeing, Human Right, and Gender Equality (if applicable)	13
4-3 Results of Climate Change Adaptation and Mitigation	13
III. Results of Joint Review	14
1. Results of the Review of the Project Performance based on DAC Evaluation Criteria	14
2. Key Factors Affecting Implementation and Outcomes	21
3. Evaluation on the results of the Project Risk Management	21
4. Lessons Learnt.	23
5. Performance.	24
6. Additionality	24
IV. For the Achievement of Overall Goals after the Project Completion	26
1. Prospects to achieve Overall Goal	26
2. Plan of Operation and Implementation Structure of the Myanmar side to achieve Overall Goal	27
3. Recommendations to the Myanmar side	28
4. Monitoring Plan from the end of the Project to Ex-post Evaluation	30

Annexes

- Annex 1 Results of the Project
- Annex 2 List of Products (Report, Manuals, Handbooks, etc.) Produced by the Project
- Annex 3 PDM (All versions of PDM)
- Annex 4 R/D, M/M, Minutes of JCC (copy)
- Annex 5 Monitoring Sheet (copy)

(Remarks: ANNEX 4 and 5 are internal reference only.)

Abbreviations

Abbreviation	Description
BRC	Biodiversity Research Center
CF	Community Forestry
CFI	Community Forestry Instruction
CFUG	CF user group
COVID 19	coronavirus disease of 2019.
DOA	Department of Agriculture
FD	Forestry Department
FDSNR	The Project for Capacity Building for Sustainable Natural Resource Management
FRI	Forestry Research Institute
GoJ	Government of Japan
HQs	Headquarters
IWUMD	Irrigation and Water Utilization Management Department
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
MMK	Myanmar Kyat
MONREC	Ministry of Natural Resources and Environmental Conservation
NGO	Non-government Organization
OJT	On-the-Job Training
PDM	Project Design Matrix
PES	Payment for Ecosystem Services
R/D	Record of Discussions
RF	Reserved Forest
RTK	Real-time kinematic
SFM	sustainable forest management
SOPs	Standard Operating Procedures
Sub-PMU	Sub-Project Management Unit
ToT	Training of Trainers
TSS	Total Suspended Solids
UNDP	United Nations Development Programme

I. Basic Information of the Project

1. Country Myanmar

2. Title of the Project

The Project for Capacity Building for Sustainable Natural Resource Management (FDSNR)

3. Duration of the Project (Planned and Actual)

(Planned) 27 June 2018 - 26 June 2023 (5 years)*

*Originally the duration of the Project was 5 years but was extended officially to 6 years until 26 June 2024.

(Actual) 27 June 2018 - 26 June 2024 (6 years)

4. Background (from Record of Discussions(R/D))

Myanmar has been rich with forest coverage of 43% of its land (33 million ha) and JICA has been carrying out Official Development Assistance Projects in forest sector for four decades which contributed to capacity development for management of community forest and mangrove forest for instance. However, rapid loss as much as 8.9 million ha of forest coverage has been witnessed from 1990 to 2015 due to economic development, land use change, mining development, and illegal logging and so forth.

The Myanmar government has paid more attentions to environmental conservation as well as rural development since 2016. Accordingly, some counter measures such as ban on illegal logging and revision of Community Forest Instruction (CFI) were introduced. Along with such policies and regulations, capacity building among related officers and actions on ground are urgent agenda on sustainable natural resource management.

As one of the serious environmental concerns, ecosystem degradation has been witnessed over the Inle Lake watershed in Shan State. The lake is one of the main tourist spots in Myanmar, attracting 140 thousand tourists per year. However, due to land use change, forest loss and degradation, erosion and sedimentation, discharge of sewer, and increasing agricultural pesticide and fertilizer use, the environment of Inle Lake and surrounding areas have been seriously degraded. Given rapid population growth in the surrounding areas and economic development, the balance between development and environmental conservation in the area became high priority agenda for the Myanmar government .

At the same time, scientific based information on biodiversity and ecosystem services needs to be properly accumulated and utilized in order to conserve and manage its rich biodiversity. Although the National Science Museum of Nature and Science and Kochi-Prefecture Makino Botanical Garden in Japan have been collaborating with Forestry Research Institute (FRI) of Forest Department (FD) under the Ministry of

Natural Resources and Environmental Conservation (MoNREC) for its specimen collection and management, its facility and capacity development are to be supported further.

By facing to these agenda and challenges, FD of MoNREC requested a technical cooperation to the Government of Japan to realize sustainable natural resource management through capacity development, consisting of three pillars, namely forest management, Inle Lake integrated watershed management, and scientific basis for biodiversity conservation for ecologically balanced rural development.

5. Overall Goal and Project Purpose (from Record of Discussions(R/D))

【Overall Goal】

Sustainable natural resource management providing multiple benefits is promoted.

【Project Purpose】

National capacity for sustainable natural resource management is strengthened.

6. Implementing Agency

Forest Department (FD), Ministry of Natural Resource and Environmental Conservation (MoNREC)

II. Results of the Project

1. Results of the Project

1-1 Input by the Japanese side (Planned and Actual)

(Planned)

(a) Amount of input by the Japanese side: 179.95 Person-Months

(b) Dispatch of Experts

(b)-1. Long-term Experts

■ Chief Advisor / natural resource management policy

■ Project Coordinator

(b)-2. Short-term Experts

(c) Training

■ Training of counterparts in Japan

(d) Facility Development

■ Biodiversity Research Center (BRC)

(e) Provision of necessary equipment

■ Equipment necessary for the BRC

- Equipment necessary for monitoring of forest resources and land use
- Equipment necessary for monitoring of river flows, rainfalls, and sediment runoff
- Equipment necessary for education and training for watershed management

(Actual: Please refer to Annex 1 for details)

(a) Amount of input by the Japanese side: 149.00 Person-Months

(b) Dispatch of Experts

(b)-1. Long-term Experts

3 Long-term Experts (Chief Advisor / natural resource management policy, Project Coordinator)

(b)-2. Short-term Experts

In Design Phase (March 2019 – March 2020)

8 Short-term Experts as listed below.

- Team Leader/Integrated Watershed Management
- Co-Team Leader/Livelihood Development/Community Forest
- Soil Erosion/Planning for Sediment Control(1)
- Soil Erosion/Planning for Sediment Control(2)
- Socio-economic Survey on house-hold level, indigenous people, and community's interest, etc.
- Land Use and Topographic Survey
- Procurement/Laser Survey
- Project Coordinator/Monitoring of Pilot Activities

In implementation Phase (July 2020 – June 2024)

12 Short-term Experts as listed below.

- Team Leader/ Integrated Watershed Management (1)/ Community Forest (2)
- Deputy Team Leader/ Integrated Watershed Management (2)/ Community Forest (1)
- Erosion Control/ Soil Conservation
- Topo Survey
- River Monitoring
- Assistance in River Monitoring
- Livelihood Development 1 (Agroforestry/ Improvement of crop production)
- Livelihood Development 1 (Socio-economic survey/ Market Analysis)
- Analysis of Soil Erosion Mechanism
- Assistance in Analysis of Soil Erosion Mechanism
- Environmental Economic Evaluation/ Project Coordinator
- Supervision of Procurement of Project Equipment

(c) Training

Training of counterparts in Japan was not conducted.

(d) Machinery and Equipment

A set of the project equipment listed below were procured for the operations of the project activities. Some of them are set and placed at the designated locations in the field.

1-2 Input by the Myanmar side (Planned and Actual)

(Planned)

- (a) Assignment of counterpart personnel
- (b) Suitable office spaces with necessary equipment for the Japanese experts
- (c) Budgetary arrangement (administration and operation costs)

(Actual)

- (a) Assignment of counterpart personnel
- (b) Suitable office spaces with necessary equipment for the Japanese experts

1-3 Activities

The global COVID-19 pandemic and the political changes have significantly affected the implementation of the Project, and the most of the activities planned in the Project were cancelled, postponed or delayed. Under such difficult circumstances, the Project has conducted the project activities online to adapt flexibly to the situations and achieve the project outputs and purpose as much as possible. The table below shows the major activities done by the project as compared to those originally planned in the Project Design Matrix (PDM).

Comparison of Activities Planned with Those actually Conducted

Planned	Actual
【Output 1】 Capacity of forest management is improved.	
1.1 Review forestry related laws and/or policies, and support the improvement if necessary	1.1 The Project was requested by FD to review the watershed management policy of Myanmar in 2020, but the review and revision of the policy was suspended and finally cancelled due to the COVID 19 pandemic and the subsequent political changes.
1.2 Develop capacity of FD officers on promotion of Sustainable Forest Management in conjunction with the Component 2	1.2 The Project conducted the following activities: - Proposed a simple UAV mapping method; - Conducted necessary training courses by Forest Tree Breeding Center (FTBC)/ Forestry and Forest Products Research Institute (FFPRI) and JIFPRO researchers; - Conducted training courses for sustainable forest management; - Conducted training courses with the provision of basic tools for forest management such as UAVs, Range Finder, VR cameras and a 3D laser

Planned	Actual
1.3 Facilitate access to external funds in order to promote sustainable natural resources management	scanner; - Conducted the field surveys using 3D laser scanner and developed two-variable equation to estimate the wood biomass of teak; - Provided guidance and training on the two variable equation to FD officials; and - Validated the two variable equation for the officialization. 1.3 The Project discussed with one private fund for promotion of sustainable natural resource management. The fund was planned to be utilized for Myanmar, but the funded activity was cancelled due to the COVID 19 pandemic and the political change.
1.4 Promote public relations on the Project	1.4 Public relations were not promoted due to the COVID19 pandemic and the political changes.
【Output 2】	
2.1 Support institutional and financial arrangement for collaborative work among the governmental organizations, the Inle Lake Authority, and the other relevant stakeholders	2,1 The Project developed the Sub-Project Management Unit (Sub-PMU) for the project management and Working Groups for the field activities. Due to the COVID19 pandemic and the political changes, it has been difficult for the Project to continue the coordinated activities, particularly those of Sub-PMU. Instead, the Project has arranged the information sharing meetings with the relevant technical departments at district and state level to share the accomplishments and results of the Project with the departments concerned.
2.2 Carry out a baseline survey on the necessary fields such as land use, population, local livelihoods, household economy, and agriculture etc.	2.2 The Project conducted the following baseline surveys: - Socio economic survey; - Assessment on land use change; - Assessment of existing gully erosion; - Assessment of soil erosion potential; - Radio carbon analysis of lake bottom soils; - Market survey; - Estimation of river discharges of the major four rivers; - Collection of data on river water levels and water velocity of the four rivers; and - Analysis of TSS in water samples taken at Kalaw river.
2.3 Promote fact-based understanding of perceived phenomena	2.3 The Project analyzed the data collected and the results of the assessments listed above to clarify the conditions of the watershed and the sedimentation conditions in the lake. Some accomplishments made by the Project are highlighted below. - Estimation of seasonal volumes of suspended sediments flown into Inle lake from Kalaw watershed - Historical changes in the water body of Inle lake - Historical changes in forest cover and land use in the watershed - Distribution of existing gully erosion in the watershed

Planned	Actual
2.4 Conduct demonstrative measures against key drivers of sedimentation 2.5 Strengthen forest management in the watershed 2.6 Incorporate findings into further policy and planning processes 2.7 Carry out public relations and advocacy activities such as knowledge sharing workshop(s) with stakeholders such as local governments, NGOs and communities	- Surface soil erosion potential in the watershed - Socio economic characteristics in the selected villages in the watershed - Sedimentation trends in the lake - Market trends in the major products at Aungbang market 2.4 The Project demonstrated the following watershed management measures effective in reduction of soil erosion, protection of existing forests, reduction of surface soil erosion, and improvement of local livelihood. - Development of gully erosion control measures at three different locations - Introduction of community forestry in two villages - Introduction of agroforestry models and provision of training courses for development of agroforestry models - Provision of training courses for improvement of production of annual crops 2.5 As mentioned above, the Project demonstrated the detailed procedures for Community Forest Introduction (CFI), since the Project found out that some existing Community Forests (CFs) were not functional enough due to the lack of CF Users Group (CFUG) members' understanding. In order for FD to introduce/ establish CF with full understanding of its purpose among CFUG members, the Project developed the detailed procedures which FD officials could follow referring the CFI. The Project had also proposed to support the policy development for a new participatory forest management scheme to be applied to production circle of Reserved Forest to improve forest management of production circle. Nevertheless, the proposed work was cancelled due to the COVID19 pandemic and the political changes. 2.6 As described above, the Project planned to support the policy development based on the results of the field demonstration. Nevertheless, the Project gave up on the idea as the scope of the project activities was forced to be reduced due to the COVID19 pandemic and the political changes. 2.7 In the design phase in 2019/2020, the Project held the stakeholder seminar shared the information of the Project with a wide range of stakeholders. In the beginning of the implementation phase, the Project also developed the project brochure/ pamphlet to be distributed to the stakeholders. Since then, no activity has been carried out in relation to this output.
【Output 3】	
3.1 Construct a herbarium and biodiversity specimen center	3.1 The BRC was constructed by the contractor under Component 3. Necessary facilities and equipment have also been procured and installed in the BRC.

Planned	Actual
3.2 Develop database on the specimen stored in the center	3.3 The herbarium specimen database was created and the installation of equipment to digitize specimens stored at the BRC was completed. The specimens stored in the center will be registered in the database.
3.3 Enhance capacity for preservation and management of specimens collected from fields and stored in the center	3.3 A series of training courses for FD/ FRI officials have been arranged and conducted by the National Museum of Nature and Science to enhance their capacity for preservation and management of specimens using the facilities of the BRC.

2. Achievements of the Project

2-1 Outputs and indicators

(Target values and actual values achieved at completion)

【Output 1】 Capacity of forest management is improved.

Achievement: Output 1 is partially achieved in accordance with the evaluation of the results of the activities and achievement level of the respective indicators as outlined below.

Indicator 1.1 The number of community forests developed in the area where trained FD staff members are involved is increased by 20% compared to the one in 2016.

Indicator 1.1 has not been achieved due to changing circumstances. The Project, particularly Component 2, originally planned to introduce CF in 6~8 villages in the watershed in its implementation phase (2020-20203) using the procedures demonstrated in the design phase (2019/2020) so that FD could increase the number of CF villages and its technical officials could learn the procedures and effects of the same through implementation. The planned activities were, however, cancelled due to the COVID19 pandemic and the political change.

Given the difficult circumstances, Component 2 decided to introduce CF only in one village (Kyauk Yae Oe village) in the implementation phase using the proposed procedures with an aim to test the same with FD officials and share the results with other FD technical officials at district and state levels.

In addition to the joint implementation of CF, the Project developed the manual for CF introduction so that FD could increase the number of CF effective in forest protection and sustainable management of existing forests.

Indicator 1.2 On average, at least 3 types of techniques and know-hows learned from the training are applied to the SFM by the trained FD staff members.

Indicator 1.2 has been achieved. Although the Project encountered such a very

challenging situation, the Project conducted various training courses for FD officials and introduced new techniques and know-hows with the state-of-the-art tools and equipment, such as UAVs, Range Finder, VR cameras, and 3D laser scanner. At present, such tools and equipment are used by FD officials for forest management activities as some of the cases are listed below.

- FD conducted field survey in teak plantation using the 3D laser scanner from November 2022 to March 2023.
- UAVs have been used for taking aerial images of the plantations, monitoring the condition of forest, checking the land surface situation before plantation establishment and soil preservations, recording the planting ceremonies and so on by FD.

In addition, the Project developed two-variable equation and improved yield table for teak plantation in Nay Pyi Taw and Bago Region and contributed to the improvement of the accuracy of forest monitoring in Myanmar.

Indicator 1.3 Two cases of external funds are facilitated by the Project for consideration within Myanmar Government.

Indicator 1.3 has not been achieved due to changing circumstances. Through coordination by the Project, there was one private fund to be utilized for sustainable forest management in Myanmar, but the funded activity was cancelled due to the COVID 19 pandemic and the political change.

【Output 2】 Integrated watershed management in the Inle Lake watershed is improved.

Achievement: Output 2 has been partially achieved in accordance the evaluation of the results of the activities and achievement level of the respective indicators as outlined below.

Indicator 2.1 JICA recommendation for integrated watershed management is incorporated into the Inle Lake Conservation Plan.

Indicator 2.1 has been partially achieved since the Project has made and incorporated the following recommendations in this Project Completion Report, but not into the Inle Watershed Restoration Program.

- Use, operate and maintain the river monitoring equipment installed in the field to collect and accumulate basic data on river discharge, rainfalls and TSS in river water of the major rivers.
- Implement the gully erosion control measures in accordance with the manual developed by Component 2 in the watershed.

- Incorporate the gully erosion control measures demonstrated by the Project into the revised 10-year Inle Watershed Restoration Program.
- Adopt the procedures for introduction of CF which Component 2 has demonstrated in Kyauk Yae Oe village as the standard method.
- Promote the agroforestry models demonstrated by Component 2 together with Department of Agriculture (DoA).

Indicator 2.2 At least 5 types of measures for better watershed management following the JICA recommendations in the project site are tested.

Indicator 2.2 has been achieved since a total of eight (8) measures effective in sustainable watershed management, which are listed below, have been tested and demonstrated by the Project in the field.

- 1) To reduce soil runoff in a small-sized gully and prevent the progress/ expansion of existing gullies:
 - 1-1) Masonry check dams with water course works (Kon Ni village)
 - 1-2) Ford crossing with masonry check dams (Aungbang RF)
 - 1-3) Contour terracing works with masonry check dams and water course works (Ton Lei village)
- 2) To protect existing forests including production circle of reserve forests
 - 2-1) Introduction of CF through a series of meetings with local communities in line with CFI and Standard Operating Procedures (SOPs) for CF
- 3) To increase vegetation covers in the watershed
 - 3-1) Introduction of agroforestry models based on perennial cash crops (e.g., avocado and others)
 - 3-2) Interplanting of annual crops between perennial trees (e.g., avocado and others) as agroforestry farms
- 4) To improve local livelihoods
 - 4-1) Introduction of improved vegetable farming techniques
 - 4-2) Effective measures to control insects for production of vegetables

Indicator 2.3 The number of community forests developed in the Project site is increased at least by 20% compared to the one in 2016.

Indicator 2.3 has not been achieved because the COVID 19 pandemic and the political changes restricted the project activities in the field. Nevertheless, the Project has demonstrated the procedures for CF introduction in two villages (Pha Yar Phyu village and Kyauk Yae Oe village) during the project period. The procedures fully follow the CFI and are found effective in ensuring the enhancement of CFUG's capacity for forest conservation and management. Although the project activity does not necessarily

contribute to the increase of the number of CF, it aimed to help FD increase the number of CF managed by CFUGs with clear understanding of its purpose and management plan, which would eventually contribute to the protection and sustainable management of existing forests in the watershed.

To help FD have a clear picture of the procedures, the Project developed and submitted the following documents to FD:

- a manual on CF introduction in a participatory manner;
- cost estimates for CF introduction; and
- a report on the results of the joint implementation of CF introduction.

Additionally, the Project recommended that FD adopt the tested procedures for CF introduction as the standard one in this Completion Report.

Indicator 2.4 Action plan of District level Working Group for CF are approved and budgeted.

Indicator 2.4 has not been achieved due to the same reason mentioned in Indicator 2.3. It is, however, expected that the following outputs submitted by the Project to FD would help FD improve the CF activities and also develop an action plan for CF introduction with the tested procedures.

- a manual on CF introduction in a participatory manner
- cost estimates for CF introduction
- a report on the results of the joint implementation of CF introduction

【Output 3】 Scientific basis for biodiversity conservation is improved.

Achievement: Output 3 has been partially achieved in accordance the evaluation of the results of the activities and achievement level of the respective indicators as outlined below.

Indicator 3.1 75% of specimens stored in the center is properly classified/categorized, preserved and managed.

Indicator 3.1 has been almost achieved. The Project newly built the BRC and procured its equipment and furniture for storing specimens and operating the BRC in a proper manner. Along with the Project, the National Museum of Nature and Science has provided technical guidance and training to the officials and researchers working in FRI, particularly those working in the BRC, in classifying/ categorizing, preserving and managing specimens in a proper manner. Although the storage, classification and categorization of specimens are still in the process as the furniture and equipment procured by the Project have been just put in place in May 2024, FD officials working in the BRC/ FRI are expected to properly classify, categorize, preserve and manage

all the specimens in the BRC using the knowledge and equipment that they have gained through the Project.

2-2 Project Purpose and its Indicator

【Project Purpose】 National capacity for sustainable natural resource management is strengthened.

【Indicator】 At least one item of the Project's outcomes developed/upgraded by the project for sustainable natural resource management is officially reflected to the policy or planning framework of the Government of Myanmar.

Achievement: It is judged that the Project Purpose has been partially achieved because of the following reasons.

- Under Component 1, the Project developed a two-variable equation for estimation of teak tree volume based on the results of field surveys in teak plantations in Nay Pyi Taw and Bago Region using 3D laser scanner. The equation uses not only diameter data but also tree height data and improves yield table. FD is currently reviewing the equation for official adoption of the same.
- The Project was also requested by FD to review the watershed management policy of Myanmar in 2020, but the review and revision of the policy was suspended and finally cancelled due to the COVID 19 pandemic and the subsequent political changes.
- In 2020, FD developed the 10-year Inle Watershed Restoration Programme, of which one of the main components was soil conservation based on the experiences and demonstrated results of the Project (Component 2 of FDSNR).
- Recommendations for sustainable forest and watershed management, based on the experiences and results of the project activities demonstrated in the field, particularly those under Component 2, are made and incorporated in this Completion Report with an aim to help FD adopt any of the recommended project activities in its future action plans or strategies.
- Simultaneously, the Project has developed and submitted several technical references, such as manuals, technical reports, and videos, on relevant techniques demonstrated in the field, so that FD and its technical officials could use them as guidelines for the conducts of any of forest and watershed management activities.
- The Project has procured and handed over a variety and number of project equipment to enable FD officials to conduct forest and watershed management activities in an effective manner according to the technical references.
- It is, therefore, concluded that the project purpose is partially achieved as the

national capacity for sustainable natural resource management has been strengthened through the provision of training opportunities, technical references, and equipment for forest management to FD, although the Project has not exactly achieved the indicator given to the project purpose in the latest PDM due to the difficulties that the Project has faced since the beginning of 2020.

3. History of PDM Modification

PDM modification was discussed at the 2nd Joint Coordinating Committee (JCC) meeting on 2nd of August, 2019, then confirmed on 9th of August, 2019. As a result, detailed of the project was described in the PDM as follows.

Comparison of the Description of Former PDM with Those of Revised PDM

	Former PDM (Ver. 1)	Revised PDM (Ver. 2)
Overall Goal Objectively Verifiable Indicators	- Any of the policy or planning framework referred to under the indicator of Project Purpose is implemented. - The rate of deforestation and forest degradation is reduced.	- The rate of deforestation and forest degradation is reduced. - The Nationally Determined Contribution (NDC) of Myanmar is promoted (increasing area of Reserved Forest and Protected Public Forest to 30% and area of Protected Areas to 10% of national land for 2030).
Outputs		
Output1 Means of Verification	- The proposal - Project completion report - The Central Forestry Development Training Centre (CFDTC) training report	- The proposal - Project completion report
Indicator 1.2	1.2 On average, at least 3 types of techniques and know-hows learned from the training are applied to the CFs by the trained FD staff members.	1.2 On average, at least 3 types of techniques and know-hows learned from the training are applied to the SFM by the trained FD staff members.
Indicator 2.4	2.4 CF Guideline developed for Taunggyi is authorized by the FD and applied to all the FD township offices in the Inle Lake region.	2.4 Action plan of District level Working Group for CF are approved and budgeted.
Indicator 2.4 の Means of Verification	- An official letter on approval of the Guideline - Project completion report and guideline as attachment to the District Forest Plan	Report from CFDWG - Taunggyi
Activities		
Activities	1.2 Develop capacity of FD officers on promotion of community forest (and related topics such as watershed management and agroforestry) in conjunction with the Component 2	1.2 Develop capacity of FD officers on promotion of Sustainable Forest Management in conjunction with the Component 2
Activities	2.5 Assess water quality in priority areas (activities are to be covered by an independent survey)	Deleted
Inputs	1 Dispatch of experts - Long-term: Chief Advisor/natural	1 Dispatch of experts - Long-term: Chief Advisor/Forest

	Former PDM (Ver. 1)	Revised PDM (Ver. 2)
	resource conservation Forest policy, Project Coordinator	policy, Project Coordinator /Biodiversity conservation

4. Others

4-1 Results of Environmental and Social Considerations (if applicable)

None

4-2 Results of Considerations on Gender/Peace Building/Poverty Reduction, Disability, Disease infection, Social System, Human Wellbeing, Human Right, and Gender Equality (if applicable)

Gender Equality

Under Component 2, the Project has encouraged women members in Pha Yar Phyu and Kyauk Yae Oe villages to participate in hands-on training on the following topics as women play an important role in agricultural production including perennial crops.

- Land preparation for planting
- Planting of avocado trees
- Maintenance of avocado trees planted
- Preparation of liquid fertilizer
- Vegetable production
- Pest control in vegetable farms
- Inter cropping in avocado plantation

Likewise, the Team tried to involve women in the discussions/ meetings arranged for CF introduction so that the comments and ideas from women members could be incorporated into the CF management plan. Nevertheless, the participation level of women in the discussions was rather limited as forest management, particularly for natural forests existing at the edge of the villages, seems to be outside their sphere of responsibility.

4-3 Results of Climate Change Adaptation and Mitigation

The main objective of the Project is to contribute to the forest protection and biodiversity conservation in Myanmar. Toward this end, the Project has provided to FD and other departments: i) several state-of-the-art equipment and devices useful for forest protection and management; ii) number of training courses or opportunities for technical officials from FD and other departments, and iii) technical references which FD and other departments could use in future. It was concluded in Section 2.2, the Project has somehow enhanced the national capacity for sustainable natural resource management in the country, which would result in reduction of GHG emissions in the

forest and agriculture sectors and also enhancement of local resilience to climate change.

III. Results of Joint Review

1. Results of the Review of the Project Performance based on DAC Evaluation Criteria

With the JICA's evaluation criteria based on the Organization for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC)'s evaluation criteria, the project performance was reviewed and evaluated by using the 4-rating system: 1) Very high, 2) High, 3) Moderately Low, and 4) Low.

(1) Relevance: High

The relevance of the Project was evaluated in terms of alignment with the national policies and plans of “the Government” of Myanmar. The results are highlighted below.

i) Alignment with National Forestry Master Plan

Forest Department developed 30-year National Forestry Master Plan (2001-02 to 2030-31) to manage the forests in a sustainable manner. National Forestry Master Plan outlines the strategic direction of the sector and covers a range of issues, including conservation, restoration, protection, production, watershed management, law enforcement, and the promotion of fuelwood substitutes.

The Project provided FD with a variety of equipment for sustainable forest and watershed management and biodiversity conservation. The Project has also arranged and conducted a number of training courses, such as seminars/ lectures, training of trainers (ToT), study tours, and joint implementation as OJT, for FD officials at FD Head Quarter (HQ) and FRI, and those in Shan State, Bago Region, etc. The officials have learned and gained the useful knowledge on forest and watershed management using the project equipment handed over to FD.

ii) Alignment with the Existing Long-Term Plans for Management and Conservation of Inle Lake and its Watershed (10-year Inle Watershed Restoration Programme)

FD developed the 10-year Inle Watershed Restoration Programme in 2020 as a master plan for promotion of sustainable conservation and management of Inle Lake watershed. The 10-year programme is composed of the following 6 components, of which the activities of 2) and 3) are closely related to those demonstrated by the Project.

- 1) Sustainable management of ecosystems in the watershed: i) watershed forest protection, ii) demarcation of the boundaries of reserved forests and public forests,

- iii) prevention of forest fires, etc.
- 2) Reforestation: i) planting of street plants, ii) support for CF management by existing CF communities, iii) management of grazing areas, iv) promotion of gap planting, v) establishment of windbreak forests, vi) promotion of planting of fruit trees, etc.
- 3) Soil and water conservation: i) inventory of existing gullies, ii) planting of vegetative materials in gullies, iii) construction of gully erosion control measures, iv) introduction of contour vegetative strips, etc.
- 4) Public awareness: i) consideration of the introduction of payment for ecosystem services, ii) conduct of training, etc.
- 5) Protection of wildlife: i) control of invasive species, ii) restoration of habitats, iii) community participation of protective works, etc.
- 6) Research and development: i) nutrient enrichment in the lake, ii) overgrowth of blue-green algae, iii) measurement of soil run-off, etc.

It is, therefore, concluded that the Project is highly relevant to the existing FD's policy on Inle Lake watershed management.

(2) Coherence: High

On the other hand, the coherence of the Project was evaluated in terms of the alignment with the policies and approaches of the Government of Japan as well as JICA. The results of the evaluation are summarized below.

i) Alignment with Policies of the GOJ and JICA

The Project contributed to the improvement of the people's living environment by the conservation and sustainable utilization of the natural environment balancing with local economic development in the Republic of the Union of Myanmar. This result is highly consistent with the Japan's Country Assistance Policy for the Republic of the Union of Myanmar, namely "Support for the improvement of people's lives (including support for ethnic minorities and the poor, agricultural development, and regional development)."

ii) Alignment with Japan's other assistance

FRI and FTBC of Japan signed a Collaborative Research Activity (CRA) in January 2020 to improve nursery techniques for teak in Myanmar. In collaboration with FTBC, the Project conducted a training course for the competent officers in collecting teak seeds in January 2020. Through the training, FD nursery staff understood that differences in the genetic characteristics of seeds have a significant impact on teak growth.

Japan International Forestry Promotion and Cooperation Center (JIFPRO) aims to enhance technical capabilities in Long-Rooted Seedlings by Using M-StAR containers. Afforestation tests were conducted in the Central Dry Zone of Myanmar in collaboration with the project in 2019.

(3) Effectiveness: Moderately Low

The effectiveness of the Project was evaluated on the basis of the level of achievement of the project purpose as described below.

i) The level of achievement of the Project Purpose

As described in Section I-2.1, it is judged that the indicator given to the project purpose is partially achieved in consideration of the following reasons.

- Soil conservation, particularly gully erosion control, demonstrated by the Project was referred by FD when FD developed the 10-year Inle Watershed Restoration Programme.
- Under Component 1, the Project procured a variety of the state-of-the-art equipment and devices useful for forest management, namely, UAVs, Range Finder, VR cameras and a 3D laser scanner, and provided training courses on the use of such equipment and devices to technical officials of FD. As a result, FD officials have used such equipment and devices, particularly UAVs and, 3D laser scanner for forest monitoring and management even without support from the Project.
- The two-variable equation, which was developed by the Project under Component 1, could be adopted by FD as the nationally standardized equation, as it enables FD to improve the accuracy of forest monitoring in teak plantations.
- The recommendations made by the Project for sustainable forest and watershed management, which were incorporated in this Completion Report, could be adopted as key strategies or interventions in FD's plans in the future.
- The technical references (e.g., manuals, technical reports, and videos) developed and submitted by the Project could be used as guidelines for FD to conduct the improved forest and watershed management activities in the future.
- It is, therefore, concluded that the national capacity for sustainable natural resource management has been strengthened through the provision of training opportunities, technical references, and equipment for forest management to FD.

(4) Impact: Moderately Low

The impact of the Project was evaluated in terms of 2 aspects: i) achievement level of overall goal (impact at overall goal level) and ii) other impacts caused by the Project. More details of the results are described below.

i) Impact at overall goal level

Narrative summary	Indicators
Sustainable natural resource management providing multiple benefits is promoted.	1) The rate of deforestation and forest degradation is reduced. 2) The Nationally Determined Contribution (NDC) of Myanmar is promoted (increasing area of Reserved Forest and Protected Public Forest to 30% and area of Protected Areas to 10% of national land for 2030).

As the indicators given to overall goal shown above are far beyond the Project and their achievement depends on other factors, it is not realistic to say that the likelihood of achievement of the Overall Goal would be high. If anything, the expectation would be rather low under the current circumstances although it might be too early to make the final judgement.

Having said so, the Project has contributed to the enhancement of FD's capacity for protection and sustainable management of existing forests through the following project activities, which could bring about positive effects in the achievement of overall goal, particularly Indicator 1.

- Provision of several state-of-the-art equipment for forest management, namely UAVs, Range finders, VR cameras, and a 3D laser scanner with software
- Provision of training in the use of the above-listed project equipment
- Demonstration of gully erosion control measures effective in stopping the progress or expansion of existing small-scale gully, which often causes forest degradation
- Provision of training opportunities (OJT and seminars) and technical references (3D videos and manuals) on the effective gully erosion control measures
- Demonstration of the detailed procedures for CF introduction in a participatory manner, which is effective in enhancing the capacity of CFUG members for sustainable forest management
- Provision of on-the-job training in the introduction and establishment of CF in accordance with the detailed procedures
- Provision of training in the development of agroforestry models with avocado trees

The enhanced capacity of FD, in terms of human resources, equipment and devices, and technical references, will help FD newly demarcate and designate Reserved Forests and Protected Public Forests, considering the following aspects.

- The equipment, such as UAVs, VR cameras, and 3D laser scanner, will help FD conduct a survey for establishing Reserved Forests, Protected Public Forests and/or Protected Areas in an effective and efficient manner.
- CF introduced in a proper manner will help FD protect Reserved Forests and

Protected Public Forests in collaboration with local communities living around those forests.

- Effective agroforest models and other sustainable farming techniques demonstrated/ introduced by the Project will help local communities produce cash crops and other valuable agricultural products in a sustainable manner, which will eventually contribute to the reduction of encroachment in existing forests.

ii) Other Impacts

There are some signs of potential positive impacts caused by the Project as highlighted below.

- The FD official who took part in OJT in the application of gully erosion control measures in the field replicated the same techniques when building gully erosion facilities on his own initiatives.
- Local communities in Pha Yah Phyu village, where the Project tried to introduce CF in a part of Aungbang Reserved Forest (RF) but CF certificate was not granted due to conflict with existing rules on CF, conducted reforestation in the proposed CF area in Aungbang RF in collaboration with FD, with an aim to protect their water sources.
- No negative impacts have been observed.

(5) Efficiency: Very High

The efficiency of the Project was evaluated by assessing how the Project has achieved the respective outputs especially in terms of time and cost as described below.

i) Prospect to achieve indicators of Outputs

As explained in Sections I-2.1 and I-2.2, the project purpose and some outputs are considered as “partially achieved,” while Output 2.2 is considered as “fully achieved” under the difficult situations after the COVID 19 pandemic and political changes. Although the majority of the project activities have been cancelled, postponed or conducted remotely, the Project was able to make the following accomplishments, which are closely related to the achievement of the project purpose and outputs.

- Various types of training were provided for FD officials as well as those from other technical departments with introduction of new techniques, know-hows, equipment and tools for forest and watershed management.
- The two-variable equation and improved yield table were developed by the Project, especially Component 1, for estimation of wood biomass of teak plantation, which would contribute to the improvement of the accuracy of forest monitoring in Myanmar.

- Effective measures for watershed management, such as river monitoring and runoff measurement, gully erosion control, CF introduction, and agroforestry development, were demonstrated in the field, along with installation of monitoring equipment, provision of training and guidance, submission of technical references related to the demonstrated measures.
- The BRC was constructed by the Project, especially under Component 3, with the installation of furniture and equipment for the BRC.

The Project implemented the project activities related to the above-mentioned achievements in close collaboration with FD officials and making full use of local resources to complement the limitation of the field works of Japanese experts. As a result, the project activities have been implemented efficiently in terms of cost-effectiveness. Also, time-effectiveness is considered rather high in consideration of the period when the experts' travel had been totally suspended as shown below.

Covid 19 pandemic: March 2020 ~ March 2021

Security reasons after the political changes: February 2021~November 2022

Considering the long break of the Project, particularly when all the stakeholders of the Project including the Myanmar side, had been forced to stay at home, it was decided by both the sides to extend the project period by one year to make up for the gaps.

In order to evaluate the efficiency, the comparison will be as follows:

- Cost effectiveness is very high: (Planned) 1,000 million Japanese Yen versus (Actual) 668 million Japanese Yen
- Time effectiveness is very high: (Planned) 6 years* versus (Actual) 6 years

*Originally the duration of the Project was 5 years but was extended officially to 6 years.

Given the conditions mentioned above, it is concluded that the Project was implemented efficiently in terms of cost-effectiveness and time-effectiveness, as it was able to reduce project cost relating to the project activities and to end its activities within the project period.

(6) Sustainability: Moderately Low

The sustainability of the Project was evaluated in terms of the following 4 aspects: policy, technical, institutional and human resources, and financial aspects. The results of the evaluation of the respective aspects are given below.

i) Policy aspect

As described in Section III-1, the project activities are highly consistent with the existing policies in the forest sector in Myanmar. It is, therefore, expected that FD would likely have the policy support for use and adoption of the project equipment and methodologies introduced by the Project. In particular, the following project

accomplishments would be likely adopted by FD for its activities in the future.

- The two-variable volume equation of teak tree could be adopted as the standard equation method to be used for forest monitoring in teak plantations.
- Gully erosion control measures could be incorporated into the 10-year Inle Watershed Restoration Programme when FD reviews and updates the same in near future.
- The demonstrated procedures for CF introduction could be adopted as the standard procedures in accordance with the CFI.
- River monitoring data could be continuously collected by FD and used for assessment of the potential impacts on water environment of Inle Lake in collaboration with Irrigation and Water Utilization and Management Department (IWUMD).

ii) Technical aspect

The Project trained FD officials on the use and management of the project equipment, namely forest monitoring equipment (e.g., UAVs, range finder, VR cameras and 3D laser scanner) under Component 1 and river monitoring equipment (e.g., water level gauges, rain gauges, and auto water samplers) under Component 2, so that the officials could use and manage the equipment in a proper manner. In fact, those for forest monitoring are currently used by FD for its operations. Although FD officials have not fully used and managed river monitoring equipment so far, it would not necessarily be technically difficult for them to use the equipment in the field but they may need some support for maintenance and repair of the same. Likewise, maintenance and repair of the forest monitoring equipment would be an issue as FD officials have no experience in doing so. In particular, due attention should be paid to the use of 3D laser scanner, as it needs to be brought to Japan when being fixed.

The demonstrated activities under Component 2 could be replicated by technical officials of FD and other departments (e.g., IWUMD and DoA) as the activities are the updates based on the existing activities, such as gully erosion control, CF introduction, and agroforestry development.

The BRC constructed by the Project under Component 3 would be properly used and managed by FRI as the knowledge base for biodiversity in Myanmar since FRI could have technical assistance from the National Museum of Nature and Science even after the end of the Project.

It is, therefore, concluded that the likelihood of continuous application of the project activities and utilization of the project equipment would be technically high.

iii) Institutional and human resource aspect

As FD will be the main organization responsible for sustainable forest management, conservation of Inle Lake watershed, and knowledge management for biodiversity conservation in the country, it is clear that FD is the key department for continuation of the project activities and continuous use of the equipment to fulfill its tasks after the completion of the Project.

FD has the field extension arms, namely District and Township FD offices. The number of FD officers at the respective levels is not necessarily sufficient to scale up the project activities, but to some extent, sufficient to continue the project activities even at the limited scale.

iv) Financial aspect

A budget constraint seems to be a major concern for the sustainability of the project activities. In particular, it might not be easy for the Myanmar side to scale up the gully erosion control measures demonstrated by the Project as it would cost 5 to 10 times as much as the one FD normally spends for building one unit of check dam.

Maintenance and repair costs of the project equipment (e.g., UAV, VR camera, 3D laser scanner, water level gauge and auto water sampler) would be another concern. It may not be easy for FD to secure necessary costs for repair of any of the equipment if FD does not set aside a certain amount of budget for such a purpose.

In order to obtain financial support for continuation of the project activities, the demonstrated measures and methods should be officially adopted and/ or incorporated into the policies, strategies or long term plans of FD.

2. Key Factors Affecting Implementation and Outcomes

The global COVID-19 pandemic and the following political changes were external factors that have significantly affected the project implementation. Due to the restrictions, the planned activities were cancelled, postponed, delayed or conducted in a remotely controlled manner.

Under such difficult circumstances, both sides, the Myanmar and Japanese sides, have made efforts to conduct as many project activities as possible, but it has been difficult for both sides to conduct coordinated works such as policy discussions or institutional development.

3. Evaluation on the results of the Project Risk Management

The Project has had the following potential risks over the course of the project implementation.

- Suspension of the project activities due to the COVID 19 pandemic and the political changes

- Safety risk of the experts while working in the field
- Risk of damage caused by natural events on the project equipment

1) Suspension of the project activities due to the COVID 19 pandemic and the political changes

As described in III-2, efforts made by both the Myanmar and Japanese sides, the Project has been implemented even under the difficult circumstances during the COVID 19 pandemic and after the political changes. The Project conducted the following activities either online or in a remotely controlled manner in close collaboration with FD officials.

- Meetings, seminars, and training courses (online)
- River monitoring (under remote control of the expert)
- Construction of gully erosion control measures (under remote control of the expert)
- Implementation of CF introduction
- Field training for local communities on agroforestry development

By doing such arrangements, the Project was able to continue the project activities even under the circumstances though they were not at the scale as originally planned.

2) Safety risk of the experts while working in the field

As the safety of the experts was one of the common concerns of both the sides. The Myanmar and Japanese sides conducted pre-reviews of the security situations in the country, particularly those where the experts planned to work, namely Taunggyi and Bago, etc., prior to the experts' trips. The experts have submitted the travel plans to both the side in advance so that they made sure to confirm the security situations. There was no security issue happening over the course of the project implementation.

3) Risk of damage caused by natural events on the project equipment

The climate events, such as heavy/ strong rains, typhoon, drought, and strong wind, have become extreme and severe recently even in Myanmar. In fact, the Project, particularly Component 2, had severe damage on its river equipment twice due to strong currents after heavy rains as shown below.

- The water level gauge set at the bridge across Negya river was flushed out by strong currents after heavy rains in August 2020.
- An intake tube and sensor of the auto water sampler set at the bridge across Kalaw river was damaged and flushed out by strong currents after heavy rains in November 2022.

Having learned from such cases, the Project applied the following protective measures to all the river equipment.

- All the water level gauges were bolted to the concrete pillars of the bridges across the major rivers so as not to be washed out by strong currents.
- A tube and sensor of the auto water sampler were set at not the center but rather the edge of the river and also cemented with or bolted to the hard structure existing at the river bottom so that they would be damaged by debris flown from the upstream.
- The main bodies of the auto water samplers were put into steel boxes fixed at the river edge where river water will not reach even in the rainy season.

4. Lessons Learnt

The Myanmar and Japanese sides identified and extracted the following lessons learnt through reviews of the overall management and framework of the Project.

Lessons	Descriptions
Allocation of sufficient time for designing of the project	Component 2 of the Project consisted of two parts: i) design phase and ii) implementation phase, in its framework. The Project spent about 1 year for assessing the present conditions of the target watershed and designing the effective interventions for watershed management including the implementation of the pilot activities as a proof of concept. Such an arrangement helped the Project develop a realistic-cum-effective plan based on the results of the pilot activities and mutual discussions with key stakeholders including those at local level (state, district and township).
Flexible response to changes in pre- and external conditions	The Project has been significantly influenced by the COVID19 pandemic and the political changes. In fact, these events had changed the pre-conditions of the Project, which is to enable the JICA experts to work with FD and other technical departments in person. Having faced such difficulties, the Project conducted the project activities online or in a remotely-controlled manner using IoT tools. The following activities were carried out by the Project even under such situations. ■ Meetings with FD and other relevant departments ■ Meetings with local communities ■ Conduct of surveys (teak biomass survey, market survey, etc.) ■ Training and technical seminars for FD and other department officials ■ Supervision of the river monitoring activities ■ Construction of gully erosion control measures ■ CF introduction Furthermore, the Project introduced new ideas which were not originally planned in the project framework but could contribute to the achievement of the project outputs/ purpose, as the second-best solutions. Development of the 3D simulation model of gully erosion control is a typical example.
Coordination between/ among the components as well as key departments	In order to achieve the project purpose, the coordination and collaboration between/ among the project components (Components 1~3) is essential. The restrictions imposed on the project activities have also restricted the coordinated activities, as each component had to conduct what they could do under the respective situations. Likewise, the communication between/

Lessons	Descriptions
	among the JICA experts and FD as well as other technical departments was not necessarily as smooth as it used to be in 2019. Although the Project maintained the communications between/ among the components and relevant stakeholders and was able to contribute to the improvement of FD's capacity for sustainable forest management through provision of training, equipment, and technical references, it might have made substantial achievements/ accomplishments, particularly on policy matters, if the Project was able to take more coordinated actions.
Collaboration with other and/ or external organization/s	The collaboration with other donors or external assisting organizations is an important factor for the Myanmar side, particularly FD, to continue and scale up the project activities even after the end of the Project. In fact, the National Museum of Nature and Science has strengthened the capacity of FRI of FD to operate the BRC and will continue the same support in the post-project period, which will ensure the sustainability of the operations of the BRC by FRI/ FD. Similarly, the Project had support from the Japanese private firm and planned to collaborate with other projects, such as the UNDP project, in the beginning, but the support and other projects had been suspended (and eventually cancelled) once the COVID19 pandemic and the political changes happened in Myanmar in 2020/2021. At this moment, it is difficult to foresee or explore the possibility of further support from other organizations except the National Museum of Nature and Science in the post-project period, though it is desirable for the Project to have external support for the continuation of the project activities.

5. Performance

The performance of the Project is outlined and summarized in Sections 1.3 and I-2,2. More details of the project activities and achievements made by the Project, particularly Component 2 of the Project, are compiled into the Project Completion Report of Component 2 submitted to FD, separately from this report.

6. Additionality

Several state-of-the-art technologies, such as UAVs and 3D laser scanners, which are used in forest management in Japan, were also provided to FD with technical guidance of the Japanese experts in the Project. The experiences in the forestry sector in Japan were also fully used in all the components as highlighted below.

- The two-variable volume equation of teak tree was developed on the basis of the experiences in calculation of tree volume in Japan.
- Auto water sampler, which has been used for monitoring of sediment runoff, were introduced and used by the Project for monitoring of the volume of suspended sediments flown into Ine Lake.
- The experiences in soil erosion control in Japan were fully used for designing and construction of the gully erosion control measures demonstrated by the Project in

the field.

- Case studies on integrated watershed management, soil conservation, and payment for ecosystem services were made and compiled into the study reports.

IV. For the Achievement of Overall Goals after the Project Completion

1. Prospects to achieve Overall Goal

【Overall Goal】 Sustainable natural resource management providing multiple benefits is promoted

【Indicator 1】 The rate of deforestation and forest degradation is reduced.

【Indicator 2】 The Nationally Determined Contribution (NDC) of Myanmar is promoted (increasing area of Reserved Forest and Protected Public Forest to 30% and area of Protected Areas to 10% of national land for 2030).

Indicator 1:

As described in Section III-1(4), the Project has contributed to the enhancement of FD's capacity for protection and sustainable management of existing forests over the course of the project implementation. Although the Project has made the following accomplishments which would directly link to the strengthening of forest protection and management of FD, Indicator 1 seems to be far beyond the goal which could be achieved as a continuation of the Project.

- FD has been equipped with several state-of-the-art equipment for forest management, namely UAVs, Range finders, VR cameras, and a 3D laser scanner with software.
- FD has learned how to use the above-listed project equipment through technical training and OJT provided by the Project.
- FD has also obtained technical references for replication of effective measures for sustainable forest management along with training opportunities (training, seminars, and OJT) and model cases (role models) in the field.

Consequently, it is not realistic to expect that the rates of deforestation and forest degradation could be reduced only by the results of the Project.

Indicator 2:

Likewise, the project activities have resulted in the enhancement of the FD's capacity for the increase of Reserved Forests, Protected Public Forests and Protected Areas considering the following aspects.

- The equipment, such as UAVs, VR cameras, and 3D laser scanner, will help FD conduct a survey for establishing Reserved Forests, Protected Public Forests and Protected Areas in an effective and efficient manner.
- CF introduced in a proper manner will help FD effectively protect Reserved Forests and Protected Public Forests.
- Effective agroforest models and other sustainable farming techniques demonstrated/ introduced by the Project will help local farmers maintain/ improve

their livelihoods through production of cash crops and other valuable agricultural products without encroachment in existing forests, which will eventually help FD designate existing forests as Reserved Forests/ Protected Public Forests.

Nevertheless, it is uncertain at this moment if Indicator 2 can be fulfilled as the project activities are not necessarily directed to the aspects of Indicator 2.

2. Plan of Operation and Implementation Structure of the Myanmar side to achieve Overall Goal

In order to achieve Overall Goal, particularly Indicators 1 and 2, the Myanmar side, especially FD, should carry out the following activities.

- Provide training courses on the use of the project equipment to FD officials working in the regions where the Project was not able to reach.
- Provide guidance and technical references on the techniques and skills relating to forest management to FD officials working in the regions where the Project was not able to reach.
- Utilize two-variable equation and improved yield table for teak plantation in Nay Pyi Taw and Bago Region.
- Implement the following activities for sustainable forest management especially in Inle Lake watershed.
 - Introduction of CFs in the existing forests and assistance in the implementation of the CF management plans
 - Implementation of gully erosion control measures demonstrated by the Project
 - Promotion of agroforestry and sustainable land management models in collaboration with DoA
- Update the baseline data of deforestation, forest degradation and areas of Reserved Forests, Protected Public Forests and Protected Areas in the country.
- Provide guidance and training with provision of technical references on the procedures for establishment of Reserved Forests, Protected Public Forests and Protected Areas.
- Conduct the forest inventory survey using the project equipment, e.g., UAVs, VR cameras and 3D laser scanner, in the proposed areas for Reserved Forests, Protected Public Forests and Protected Areas.

The activities listed above will be carried out by FD and its branch offices, namely District and Township offices, in collaboration with the relevant FD technical divisions (i.e., CF division, Watershed Management Division, etc.). Those relating to agroforestry will be carried out in collaboration with DoA and its District/ Township offices concerned.

3. Recommendations to the Myanmar side

As indicated in Section III-1(6), the sustainability of the Project is the key concern of the Project. Clear political support with financial assistance is requisite for maintenance, continuous operations, and scale-up of the project activities under Components 1 to 3. Specifically, the following recommendations should be addressed by the Myanmar side for improvement of the project sustainability and ensuring of the positive impacts generated by the Project.

1) Proper use and maintenance of the project equipment for monitoring of forest resources

The project equipment provided for monitoring of forest resources, i.e., range finder, VR cameras and 3D laser scanner should be used, operated, and maintained by FD and its branch offices in a proper manner. At the same time, the officials who equipped with necessary knowledge and skills for the use of the equipment should be maintained for the time being and used as trainers for other FD officials so that many officials could use the equipment. Furthermore, FD should maintain the equipment, particularly range finder and 3D laser scanner, properly as much as possible, since it would be difficult to fix the same within the country.

2) Officialization and utilization of two-variable equation and improved yield table for teak plantation in Nay Pyi Taw and Bago Region

The project developed two-variable equation and improved yield table for teak plantation in Nay Pyi Taw and Bago Region. In addition, FD conducted the validation of the two-variable equation. Based on the result, it is very important to utilize it to improve the accuracy of forest monitoring in Myanmar.

3) Continuation of River Monitoring and Use of Accumulated Data for Watershed Management

The Project has accumulated the baseline data used for estimation of the river discharge and the volume of suspended sediments flown into Inle lake using the project equipment installed under Component 2. As no monitoring activity has been continuously conducted around Inle Lake so far, it is highly crucial for the Myanmar side, particularly those relating to Inle Lake management/ conservation, to continue the following monitoring activities and accumulate the baseline data of the major rivers to analyze the hydrologic features of Inle Lake and to estimate the sediment inflow from the watershed.

- i) collection of log data of water level gauges

- ii) collection of log data of rain gauges
- iii) collection of water samples from auto water samplers
- iv) sending of collected water samples to FRI for TSS analysis, and
- v) maintenance of the equipment,

In order for FD, especially Nyaung Shwe Township FD, to continue the river monitoring activities, it is necessary to allocate sufficient budget for the regular monitoring activities including the transportation of water samples to FRI and FRI fees for TSS analysis. FD should also secure a certain amount of budget for maintenance of the equipment (e.g., replacement of parts and repair of the main bodies).

4) Replication and scale-up of the gully erosion control measures demonstrated by the Project

Gully erosion control is one of the essential actions to reduce the inflow of suspended sediments into Inle Lake as the eroded soils from gullies in the watershed are considered as the main source of suspended sediments flown into Inle Lake during the rainy season. Based on the results of the assessment of the present conditions of existing gullies and reviews of past FD's interventions in the watershed, the Project figured out that stopping the progress of gully at the initial stage would be the most effective and realistic way to reduce soil runoff from the watershed to the lake since it would be more costly, time-consuming and technically difficult to apply countermeasures once the gully evolves into a medium to large size.

Although FD has programmed the gully erosion control component into the 10-year Inle Lake Conservation Plan, the majority of the proposed activities are single check dams which are cheaper than the ones demonstrated by the Project. It is, therefore, recommends that a series of small-scale wet masonry check dams, like the ones demonstrated by the Project, should be incorporated into Inle Lake Conservation Plan as one of the main countermeasures, so that District and Township FD offices concerned would replicate and roll out the control measures proposed by the Project in the watershed.

5) Adoption of the Procedures demonstrated by the Project for CF Introduction

CF is one of the strategic way to protect existing forests from unregulated exploitation or encroachment. Such a scheme is effective in protection of forests especially when local communities living nearby the target forests are willing to protect or use/ manage target forests sustainably as their asset. However, some of the existing CFs are found not functioning well as planned due to a lack of understanding of CF among CF user group members. The Project, therefore, proposed and demonstrated the detailed procedures according to the CFI in the field and developed a manual of the

participatory CF introduction as a reference for FD officials.

The procedures are evaluated effective in enhancing local communities' understanding of the objectives of CF and also CF management plan that they would develop, although the process might be time-consuming as compared to the prevailing conventional method.

It is recommended that FD, particularly Taunggyi District FD, should adopt and use the procedures as the standard method since they fully follow the description of the CFI and have been proved effective in ensuring the sustainability of CF in the watershed.

6) Promotion of Agroforestry Models in collaboration with DoA

Likewise, agroforestry farming is one of the effective practices for sustainable land management which should be further promoted and scaled up in the watershed to increase vegetation covers and reduce the expansion of soil/ gully erosion. As the unit cost of seedling of fruit tree is usually as high as MMK 5,000 ~ 8,000/pc, it is not easy for FD and DoA to assist local communities in the development of new plantation through provision of seedlings.

It is, however, ideal for FD and DoA to promote fruit tree-based agroforestry models through provision of technical training and fruit tree seedlings to local communities, as part of the activities for conservation of Inle Lake watershed.

7) Provision of Administrative and Financial Supports for Proper and Sustainable Operations of the BRC

In order to make the BRC functional with the use of its facility and equipment, FD is recommended to keep securing necessary administrative and financial support for operations and management of the BRC. One of the crucial points to be address is to maintain the FD officials who have had training/ guidance given by the Project and/ or the National Museum of Nature and Science on the knowledge/ skills for the BRC operations, such as storing, classification/ categorization, preservation and management of specimens collected. Another crucial point is the budget allocation to the BRC as it would require a certain amount of operating costs for daily operations, regular maintenance, and repairs in addition to staffing cost.

4. Monitoring Plan from the end of the Project to Ex-post Evaluation

(If the Project will be continuously monitored by JICA after the completion of the Project, mention the plan of post-monitoring here.)

Any JICA project is subject to the Ex-post Evaluation of JICA. Consequently, JICA will arrange and conduct the Ex-post Evaluation of the Project in coordination with the

Myanmar side, particularly FD, in a few years after the completion of the Project. In order to make the Ex-post Evaluation efficient and enhance the sustainability of the project activities, FD is requested to periodically monitor its activities related to the Project in the post-project period.

The following table shows a draft idea of the monitoring plan that FD could use for the monitoring in future.

Monitoring items	Monitoring Points (indicators)	Frequency	Means of monitoring	Division responsible
O&M of the project equipment	1) Conditions of the project equipment 2) Use of the project equipment	Once a year	1) Direct observation 2) Interview to the FD officials concerned	Watershed Management Division (WMD)
Continuation of river monitoring activities	1) Existence of accumulated river monitoring data 2) Use of the river monitoring data	Once a year	1) Direct observation 2) Interview to the FD officials concerned	WMD
Replication of gully erosion control measures	1) Number of the demonstrated gully control measures applied 2) Incorporation of the demonstrated measures into the 10-year Inle Lake Watershed Conservation Plan	Once a year	1) Interview to the FD officials concerned 2) Confirmation of the revised 10-year Inle Lake Watershed Conservation Plan	WMD
Adoption of procedures for CF introduction	1) Number of CF introduced with the procedures proposed 2) Adoption of the procedures in the annual plans of District FD concerned	Once a year	1) Confirmation of data of CF introduction 2) Confirmation of the annual plans	WMD
Promotion of agroforestry models	1) Number of Agroforestry models introduced 2) Number of training courses arranged by DoA on agroforestry development	Once a year	1) Interview to DoA officials 2) Ditto	WMD
Provision of administrative and financial support to the BRC	1) Organizational structure of the BRC 2) Budget plan of the BRC	Once a year	1) Confirmation of the organizational structure of the BRC 2) Confirmation of the budget plan for the BRC	WMD

Monitoring items	Monitoring Points (indicators)	Frequency	Means of monitoring	Division responsible
Reduction of deforestation and forest degradation	1) Forest cover in the country	Once a year	1) Confirmation of the data on the forest cover	WMD
Increase of Reserved Forest, Public Protected Forest, and Protected Area	1) Number of Reserved Forest, Public Protected Forest, and Protected Area	Once a year	1) Confirmation of data of Reserved Forest, Public Protected Forest, and Protected Area	WMD

ANNEX 1: Results of the Project

(List of Dispatched Experts, List of Counterparts, List of Trainings, etc.)

(1) Long-Term Experts

No	Title	Duration
1	Chief Advisor / natural resource management policy	27 June 2018 to 26 June 2020
2	Coordinator/biodiversity conservation	12 November 2018 to 11 November 2021
3	Chief Advisor/ natural resource management policy	21 November 2020 to 26 June 2023

(2) Short-Term Experts

In Design Phase (March 2019 – August 2020)

No	Title	Total Person Months Assigned
1	Team Leader/Integrated Watershed Management	4.45 MM
2	Co-Team Leader/Livelihood Development/Community Forest	2.30 MM
3	Soil Erosion/Planning for Sediment Control(1)	1.07 MM
4	Soil Erosion/Planning for Sediment Control(2)	3.00 MM
6	Socio-economic Survey on house-hold level, indigenous people, and community's interest, etc.	1.6 MM
7	Land Use and Topographic Survey	3.00 MM
8	Procurement/Laser Survey	3.28 MM
9	Installation of Equipment	0.33 MM
10	River Monitoring	0.27 MM
11	Project Coordinator/Monitoring of Pilot Activities	1.87 MM
12	Training Planning	0.70 MM

In Implementation Phase (July 2020 – June 2024)

No	Title	Total Person Months Assigned
1	Team Leader/ IWM1/ CF2	9.34 MM
2	Deputy Team Leader/ IWM2/ CF1	8.02 MM
3	Erosion Control/ Soil Conservation	10.65 MM
4	Topo Survey	4.02 MM
5	River Monitoring	4.15 MM
6	Assistance in River Monitoring	0.50 MM
7	Livelihood Development 1 (Agroforestry/ Improvement of crop production)	5.56 MM
8	Livelihood Development 1 (Socio-economic survey/ Market Analysis)	3.51 MM
9	Analysis of Soil Erosion Mechanism	2.42 MM
10	Assistance in Analysis of Soil Erosion Mechanism	0.98 MM
11	Environmental Economic Evaluation/ Project Coordinator	3.55 MM
12	Supervision of Procurement of Project Equipment	2.60 MM

(3) Counterparts

No	Name	Role in the Project	Title	Duration
Forest Department, Ministry of Natural Resource and Environmental Conservation				
1	Dr. Nyi Nyi Kyaw	Project Director	Director General, Forest Department	27-6-2018 to 15-9-2021
2	Mr. Htay Aung	Project Director	Director General, Forest Department	16-9-2021 to 15-7-2023
3	U Hla Maung Thein	Project Director	Director General, Forest Department	16-7-2023 to 2-10-2023
4	Dr Thaung Naing Oo	Project Director	Director General, Forest Department	3-10-2023 to date
5	Mr Bo Ni	Project Facilitator	Director, Watershed Management Division	27-6-2018 to 6-8-2018
6	Mr Zaw Win Myint	Project Facilitator	Director, Watershed Management Division	7-8-2018 to 15-10-2019
7	Mr. Soe Myint Oo	Project Facilitator	Director of Watershed Management Division	16-10-2019 to 15-2-2021
8	Mr. Pe Chit	Project Facilitator	Director of Watershed Management Division	1-3-2021 to 8-6-2021
9	Mr Moe Thu	Project Facilitator	Director of Watershed Management Division	7-6-2021 to 21-1-2024
10	U Oakkar	Project Facilitator	Director of Watershed Management Division	22-1-2024 to date
11	Dr Win Maung Aye	Assistant Project Facilitator	Assistant Director of WMD	24-11-2021 to date
12	Mr. Sithu Aung	Focal Person	Staff Officer, WMD	27-6-2018 to 1-2-2021
13	Ms. Thet Myat Yandamar Aye	Focal Person	Range Officer/ Staff Officer, WMD Staff Officer, WMD	27-6-2018 to 19-10-2023
14	Mr Swuam Pyaye Aye Aung	Focal Person	Staff Officer, WMD	20-10-2023 to date
15	Ms. Nang Yu War	Focal Person	Range Officer, WMD	27-6-2018 to 24-12-2021

(4) Trainings of counterparts in Japan

Date	Objective	Venu	Participants
Nov 4 th to 10 th 2018	Watershed management and disaster control	Tokyo, Tochigi Pref, etc.	5
Oct 28 th to Nov 2 nd 2019	Watershed Management and disaster control	Tokyo, Nagano Pref, etc.	4
Dec 1 st to 14 th 2019	Watershed Management and disaster control	Tokyo, Nagano Pref, etc.	5

(5) Trainings of counterparts in Myanmar

Date	Objective	Venu	Participants
Apr 4 th to 6 th , Jul 17 th to 19 th , Sep 11 th to 13 th 2019 Jan 8 th to 10 th 2020	UAV operation, UAV mapping, Range Finder and VR camera operation	Taunggyi District in Shan State	30
Jun 20 th 21 st , Dec 11 th to 13 th 2019	UAV operation, Range Finder and VR camera operation	Kyaukme District in Shan State	17
Jun 26 th to 28 th , Oct 2 nd to 4 th 2019	UAV operation, Range Finder and VR camera operation	Loikaw District in Kayah State	22
Jun 17 th , 24 th , Jul 3 rd , 10 th , Aug 23 rd , Sep 6 th 27 th , Oct 17 th , 2019	UAV operation, UAV mapping, Range Finder and VR camera operation	FDHQ	Each time about 6
May 2 nd , Sep 18 th 2019	UAV operation, VR camera operation	CFDTC	
Jun 21 st 22 nd , Dec 12 th 2019	Bitterlich, UAV operation	Myanmar Forest School	
Feb 13 th , 25 th 2020	Bitterlich, UAV operation	University of Forest and Natural Science	
Apr 20 th 2022	Range Finder and VR camera operation	FDHQ	12
Apr 21 st 2022	UAV operation	FDHQ	12
Nov 2 nd 3 rd 2022	3D laser scanner operation	FDHQ	7
Jan 10 th 2023	Range Finder and VR camera operation	Pyay District Office in Bago Region	22
Jan 12 th 2023	Range Finder and VR camera operation	Bago District Office in Bago Region	20
Apr 19 th 20 th 2023	3D laser scanner operation	FDHQ	12
May 4 th 2023	Range Finder and VR camera operation	FDHQ	18
	3D laser scanner data analysis	FDHQ	7

(6) Equipment

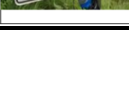
Under Component 1

Acquisition Date	Item Name	Specification Model	Total price (JPY)	Total Price (Foreign Currency)		Purpose
2018/8/17	Laptop PC	Dell Inspiron	102,054	919	USD	
2018/8/20	Cupboard	CY042	18,653	242,000	MMK	
2018/9/10	Tablet PC	iPad mini4	55,367	497	USD	
2018/8/16	Book Shelf	FS 410 Leeco	21,582	280,000	MMK	
2018/10/18	Cupboard	MK-06	12,238	171,000	MMK	
2019/1/18	Projector	X138WH	61,678	859,500	MMK	

Acquisition Date	Item Name	Specification Model	Total price (JPY)	Total Price (Foreign Currency)		Purpose
2019/1/19	Office Desk	SM-005	14,854	207,000	MMK	
2019/2/23	Desktop PC	8th Gen Core i7 Processor	102,256	1,405,970	MMK	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7A	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	2,965	2,965	JPY	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC	Intel Core 7	327,404	2,965	USD	
2019/4/9	Desktop PC					
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	

Acquisition Date	Item Name	Specification Model	Total price (JPY)	Total Price (Foreign Currency)		Purpose
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/4/9	Tablet PC	iPad Mini 4	60,181	545	USD	
2019/12/19	3D laser scanner	OWL	4,335,300		JPY	
2022/3/22	Laptop PC	GP66 Leopard 11U	2262		USD	

Under Component 2

No.	Product name	Specification	Manufacturer	Quantity	Current state	Current location	Memo	Picture1
Equipment installed/ placed in the field								
1	Area velocity flowmeter	ISCO 2150 area velocity flow module	Nikkaki Bios Co., Ltd.	1	Operating	Tan Daung bridge	purchased in the 1st phase	
2	Area velocity flowmeter	ISCO 2150 area velocity flow module	Nikkaki Bios Co., Ltd.	1	Operating	Tain Nan bridge	purchased in the 2nd phase	
3	Automatic water sampler	ISCO 6712 water sampler and 674 rain gauge	Nikkaki Bios Co., Ltd.	1	Operating	Tan Daung bridge	purchased in the 1st phase	
4	Automatic water sampler	ISCO 6712 water sampler and 674 rain gauge	Nikkaki Bios Co., Ltd.	1	Operating	Tain Nan bridge	purchased in the 2nd phase	
5	Water level gauge	Waterproof Water Level Gauge WP-1E	Osashi Technos Co., Ltd.	1	Operating	In Dein bridge	purchased in the 1st phase	
6	Water level gauge	Waterproof Water Level Gauge WP-1E	Osashi Technos Co., Ltd.	1	Operating	Tai Yo bridge	purchased in the 1st phase	
7	Water level gauge	Waterproof Water Level Gauge WP-1E	Osashi Technos Co., Ltd.	1	Operating	Tain Nan bridge	purchased in the 1st phase	
8	Water level gauge	Waterproof Water Level Gauge WP-1E	Osashi Technos Co., Ltd.	1	Operating	Tan Daung bridge	purchased in the 1st phase	
9	Water level gauge	Waterproof Water Level Gauge WP-1E	Osashi Technos Co., Ltd.	1	Operating	Negya resevoir	purchased in the 2nd phase	
10	Rain gauge	0.1mm tipping bucket		1	Operating	Negya resevoir	purchased in the 2nd phase	
11	Rain gauge	ISCO 674 rain gauge	Nikkaki Bios Co., Ltd.	1	Operating	Aun Bang	purchased in the 1st phase	
12	Rain gauge	ISCO 674 rain gauge	Nikkaki Bios Co., Ltd.	1	Operating	Ei Yar gully	purchased in the 1st phase	
13	Tensiometer	Campbell CR1000X data logger	Daiki Rika Kogyo Co., Ltd.	1	Operating	Ei Yar gully	purchased in the 2nd phase	

Equipment kept at the project office								
1	River monitoring camera	Haiku Cam SP2 automatic shooting camera	Techno Forest Co., Ltd.	1	Kept in storage	Project office in Nyaungshwe	purchased in the 1st phase	
2	River observation camera	Haiku Cam SP2 automatic shooting camera	Techno Forest Co., Ltd.	1	Kept in storage	Project office in Nyaungshwe	purchased in the 1st phase	
3	River observation camera	Haiku Cam SP2 automatic shooting camera	Techno Forest Co., Ltd.	1	Kept in storage	Project office in Nyaungshwe	purchased in the 1st phase	
4	River observation camera	Haiku Cam SP2 automatic shooting camera	Techno Forest Co., Ltd.	1	Kept in storage	Project office in Nyaungshwe	purchased in the 1st phase	
5	Electromagnetic current meter	KENEK electromagnetic current meter LP40	Nikikaki Bios Co., Ltd.	1	Kept in storage	Project office in Nyaungshwe	purchased in the 1st phase	
6	Mult-fold pF meter	DIK-3424 Measurement range 3.9~155.4kPa (pF 1.6~3.2)	Daiki Rika Kogyo Co., Ltd.	1	Kept in storage	Project office in Nyaungshwe	purchased in the 2nd phase	
7	Soil permeability measuring device	DIK-4012 4-fold type permeameter	Daiki Rika Kogyo Co., Ltd.	1	Kept in storage	Project office in Nyaungshwe	purchased in the 2nd phase	
8	Multi sampler	DAIKI multi-sampler DIK-180A (for mud and water sampling) for 5m	Daiki Rika Kogyo Co., Ltd.	1	Operating	Project office in Nyaungshwe	purchased in the 1st phase	
9	Soil sampler	DAIKI Φ5cm soil sampler	Daiki Rika Kogyo Co., Ltd.	1	Operating	Project office in Nyaungshwe	purchased in the 1st phase	
10	Printer multifunction device	Canon Image Runner C3020	Myanmar Golen Rock International Co.,Ltd.	1	Operating	Project office in Nyaungshwe	purchased in the 1st phase	
11	RTK equipment	REACH RS2 Multibands RTK GNSS Reciever	Asian Air Survey	2	Operating	Project office in Nyaungshwe	purchased in the 2nd phase	
12	License of Software for drone image analysis	Pix4Dmapper	PIX4D	3	PDF file	Project office in Nyaungshwe		No photo available
13	Terrestrial laser data analysis software	OWL Manager and OWL Construction	AdIn Research, Inc.	1	Kept in storage	Project office in Naypyidaw		No photo available
14	Terrestrial laser data analysis software	OWL Manager and OWL Construction	AdIn Research, Inc.	3	Kept in storage	Project office in Naypyidaw		No photo available
15	Ipad	64GB	Apple	1	Operating	Project office in Nyaungshwe		No photo available
16	Laptop PC	ASUS Zenbook 14	ASUS	1	Operating	Project office in Nyaungshwe		No photo available

Under Component 3

(1) Plant Specimen (4 Rooms)

1) Fungi Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Full-size steel shelf	H 1800	24	1350 x 520 x 1800 mm	BRC-001-193/216 ~ 216/216
2	Dehumidifier	HM-2408D	1	240 liters/day	BRC-045-7/7
3	Thermometer		1		BRC-046-1/5

2) Herbarium Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Full-size steel shelf	H 1800	192	1350 x 520 x 1800 mm	BRC-001-1/216 ~ 192/216
2	Half-size steel shelf	H 1050	82	1350 x 520 x 1050 mm	BRC-002-1/82 ~ 82/82
3	Dehumidifier	HM-2408D	6	240 liters/day	BRC-045-1/7 ~ 6/7
4	21 drawer low cabinet	TU 118-21D	6	1180 x 407 x 915 mm	BRC-003-1/6 ~ 6/6
5	Binocular stereo zoom microscope	Euromex NZ.1902-U	1		BRC-008-1/2
6	Trinocular stereo zoom microscope	Euromex NZ.1903-B	1		BRC-008-2/2
7	Ring light for microscope		3		BRC-051-1/3 ~ 3/3
8	Ladder		4		BRC-010-1/4 ~ 4/4
9	Working table (small)	PO5125	20	1473 x 610 x 746 mm	BRC-004-1/21 ~ 20/21
10	Round chair (red)	XY 040	13		BRC-006-1/25 ~ 13/25
11	PC table	JSSY 02	2	1800 x 900 x 710-117 mm	BRC-005-1/2 ~ 2/2
12	Chair with backrest (black)	B 851	2		BRC -007-1/2 ~ 2/2
13	iMac	24" (512GB) Silver	1	Unified memory 16 GB, 8 core CPU, 8 core GPU, 16 core neural engine	BRC-011-1/2
14	UPS for iMac		1		BRC-039-1/3
15	MS-office for iMac		1	software	BRC-052
16	Clarif File Maker Pro		1	software	BRC-053
17	DVD drive for iMac	Transcend TS8XDVDS Ultra-Thin External Writer	1		BRC-054
18	Moving shelves and carts	FYS 011	1	170 x 170 x 465 mm	BRC-009-1/5
19	Photo box		1		BRC-047
20	Nikon camera power adapter and power connector	EH-5b, EP-5B	1		BRC-055
21	Nikon Camera Control Pro 2		1	software	BRC-056
22	Thermometer		1		BRC-046-2/5
23	Dust Bin	MTZ	1	100 Liter	BRC-059-1/5

3) Mounting and Sorting Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Sorting cabinet		1	4500 x 300/430 x 1800 mm	BRC-022
2	Drying cabinet		1	3500 x 430/450 x 1800 mm	BRC-023

No	Name of Product	Model No.	Quantity	Remark	Label No.
3	Office desk (1)	OD 35	2	1075 x 688 x 750 mm	BRC-024-1/2 ~ 2/2
4	Chair for office desk (1)	UF 6060G	2		BRC-025-1/2 ~ 2/2
5	Office locker (half)	ZYFCB-2D	1	900 x 400 x 1850 mm	BRC-021-1/2
6	Office locker (full)	ZYFCA 18	1	900 x 400 x 1850 mm	BRC-021-2/2
7	Working table (medium)	HT80 6036	2	1800 x 1200 x 750 mm	BRC-014-1/2 ~ 2/2
8	Working table (Large)	RW 0524	1	2400 x 1200 x 900 mm	BRC-019
9	Round chair (Red)	XY 040	4		BRC-006-14/25 ~ 17/25
10	Moving shelves and carts	FYS 011	1	170 x 170 x 465 mm	BRC-009-2/5
11	Desktop PC	Lenovo think centre M70t Gen3 Desktop (i5), GM0458GF	1	with 28" LCD display, MS-Windows 11, and Ms-Office 2021	BRC-039
12	UPS for desktop PC		1		BRC-039-2/3
13	Color printer	Canon LBP 674Cx	1		BRC-013
14	Ruler for photography	Itech Science	1		BRC-057
15	Color checker	calibrite CLASSIC MINI	1		BRC-058
16	Thermography camera	HIKMICRO E1L	1		BRC-061
17	Thermometer		1		BRC-046-3/5
18	Forest Department Stamp		2		BRC-063
19	Unit boxes for specimen (large size)		400		
20	Unit boxes for specimen (medium size)		3,100		
21	Dust Bin	MTZ	2	100 Liter	BRC-059-2/5 ~ 3/5

4) Drying and Freezing Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Cleanroom drying oven	Memmert UF750plus	1		BRC-017
2	Freezer	Panasonic MFR400H2MM	1		BRC-016
3	Working table (large)	RW 0524	1	2400 x 1200 x 900 mm	BRC-019
4	Working table (medium)	HT80 6036	1	1800 x 1200 x 750 mm	BRC-014-1/8
5	Round chair (blue)	XY 040	4		BRC-006-18/25 ~ 21/25
6	Office rack (storage shelf) (large)	GS 2K2	1	2030 x 457 x 2070 mm	BRC-018
7	Storage shelf (6 shelves)		1	2000 x 600 x 2000 mm	BRC-033-1/11
8	Moving shelves and carts	FYS 011	2	170 x 170 x 465 mm	BRC-009-3/5 ~ 4/5
9	Vacuum cleaner	KARCHER	1		BRC-048
10	Robot cleaner	iRobot	2		BRC-049-1/2 ~ 2/2

(2) Animal Specimen (6 Rooms)

1) Wet Specimen Preparation Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Working table (medium)	HT80 6036	2	1800 x 1200 x 750 mm	BRC-014-3/8 ~ 4/8
2	Round chair (black)	XY 040	4		BRC-006-1/12 ~ 4/12
3	Office desk (1)	OD 35	1	1075 x 688 x 750 mm	BRC-024-1/3
4	Chair for office desk (1)	UF 6060G	1		BRC-025-1/3
5	Fume hood	By-pass airflow fume hood Class I (FHB-180)	1		BRC-044
6	Office locker (half)	ZYFCB-2D	1	900 x 400 x 1850 mm	BRC-021-1/6
7	Office locker (full)	ZYFCA 18	1	900 x 400 x 1850 mm	BRC-021-2/6

2) Wet Specimen Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Working table (small)	PO5125	5	1473 x 610 x 746 mm	BRC-004-6/10 ~ 10/10
2	Storage shelf (6 shelves)		10	2000 x 600 x 2000 mm	BRC-033-2/11 ~ 11/11
3	Moving shelves and carts	FYS 011	3	170 x 170 x 465 mm	BRC-009-1/3 ~ 3/3

3) Dry Specimen Preparation Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Working table (large)	RW 0524	1	2400 x 1200 x 900 mm	BRC-019
2	Working table (small)	PO5125	1	1473 x 610 x 746 mm	BRC-004-21/21
3	Round chair (black)	XY 040	2		BRC-006-22/25 ~ 23/25

4) Bird Mounting Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Working table (medium)	HT80 6036	2	1800 x 1200 x 750 mm	BRC-014-5/8 ~ 6/8
2	Round chair (black)	XY 040	4		BRC-006-5/12 ~ 8/12
3	Office desk (1)	OD 35	1	1075 x 688 x 750 mm	BRC-024-2/3
4	Chair for office desk (1)	UF 6060G	1		BRC-025-2/3
5	Office locker (half)	ZYFCB-2D	1	900 x 400 x 1850 mm	BRC-021-3/6
6	Office locker (full)	ZYFCA 18	1	900 x 400 x 1850 mm	BRC-021-4/6

5) Insect Mounting Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Working table (medium)	HT80 6036	2	1800 x 1200 x 750 mm	BRC-014-7/8 ~ 8/8
2	Round chair (black)	XY 040	4		BRC-006-9/12 ~ 12/12
3	Office desk (1)	OD 35	1	1075 x 688 x 750 mm	BRC-024-3/3
4	Chair for office desk (1)	UF 6060G	1		BRC-025-3/3
5	Office locker (half)	ZYFCB-2D	1	900 x 400 x 1850 mm	BRC-021-5/6
6	Office locker (full)	ZYFCA 18	1	900 x 400 x 1850 mm	BRC-021-6/6
7	Freezer	Panasonic MFR400H2MM	1		BRC-016

6) Dry Specimen Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Working table	PO5125	5	1473 x 610 x 746 mm	BRC-004-1/10 ~

No	Name of Product	Model No.	Quantity	Remark	Label No.
	(small)				5/10
2	Dehumidifier	HM-2408D	2	240 liters/day	BRC-045-1/2 ~ 2/2
3	Full-size steel shelf for insect specimen		14	1139 x 470 x 1648 mm	BRC-001-43/58 ~ 56/58
4	Full-size steel shelf for bird and mammal specimen		42	1139 x 470 x 1648 mm	BRC-001-1/58 ~ 42/58
5	Full-size steel shelf for mammal fur specimen		2	1139 x 470 x 2121 mm	BRC-001-57/58 ~ 58/58
6	Specimen Boxes		211	507 x 418 x 60 mm	BRC-060-1/211 ~ 211/211

(3) Common (3 Rooms)

1) Storage Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Office rack (storage shelf) (large)	GS 2K2	2	2030 x 457 x 2070 mm	BRC-018-1/2 ~ 2/2
2	Storage cabinet (medium)	FY15-005	1	2000 x 600 x 2000 mm	BRC-033-1/2
3	Handcart		3		BRC-009-1/3 ~ 3/3

2) Curator Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Storage cabinet (small)	SYH 004	1	915 x 400 x 1800 mm	BRC-032
2	Storage cabinet (medium)	FY15-005	1	2000 x 600 x 2000 mm	BRC-033-2/2
3	Working table (medium)	HT80 6036	1	1800 x 1200 x 750 mm	BRC-014-2/8
4	Office desk (2)	2UM 03 (1400)	2	1400 x 600 x 750 mm	BRC-029
5	Chair with backrest (black)	B 851	2		BRC-007-3/4 ~ 4/4
6	Office locker	FCB 06	2	900 x 400 x 1850 mm	BRC-028-1/2 ~ 2/2
7	B/W printer	Canon LBP-325X	1		BRC-031
8	Trinocular stereo zoom microscope	Euromex NZ.1903-B	1		BRC-008
9	Arm-type light for microscope		1		BRC-062
10	External HDD	WD 4TB White My Passport	2		BRC-012-1/2 ~ 2/2
11	Thermometer		1		BRC-046-4/5

3) Library Room

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Copier	Canon iR-2425	1		BRC-042
2	Center table	AT 0524	1	2400 x 1200 x 900 mm	BRC-037
3	Desk for PC	TS 0116	2	1600 x 750 x 750 mm	BRC-040-1/2 ~ 2/2
4	Chair with backrest (Red)	B 808	2		BRC-041-1/2 ~ 2/2
5	Round chair (black)	XY 040	2		BRC-006-24/25 ~ 25/25
6	Bookshelf	S 317	9	962 x 493 x 1965 mm	BRC-035-1/9 ~ 9/9
7	Office locker (book)	GG 204G	5	900 x 400 x 1850 mm	BRC-036-1/5 ~ 5/5
8	iMac	24" (512GB) Silver	1	Unified memory 16 GB, 8 core CPU, 8 core GPU, 16 core neural engine	BRC-011-2/2
9	UPS for iMac		1		BRC-039-3/3

No	Name of Product	Model No.	Quantity	Remark	Label No.
10	Moving shelves and carts	FYS 011	1	170 x 170 x 465 mm	BRC-009-5/5
11	Thermometer		1		BRC-046-5/5

(4) Under Portico

No	Name of Product	Model No.	Quantity	Remark	Label No.
1	Dust Bin	MTZ	2	100 Liter	BRC-059-4/5 ~ 5/5

ANNEX 2: List of Products (Report, Manuals, Handbooks, etc.) Produced by the Project

No	Item	Type	Description	Issued Year (last version)
1	OWL Survey Manual	Manual	Manual about how to conduct field survey using 3D laser scanner in teak plantation	2022
2	Two-variable Teak Volume Equation	Presentation and raw data	Equation to estimate the volume of standing teak trees using not only the data of diameter at breast height but also the data of tree height.	2023
3	Improved Yield Table for Teak Plantation	Presentation and raw data	Yield table for teak plantation based on the newly developed two-variable equation.	2023
	Manual on River Monitoring and Soil Runoff Mechanism assessment	Manual	Methodologies and procedures for monitoring river discharge, TSS and soil runoff using the project equipment	2024
	Technical Material on UAV Application for Natural Resource Management	Presentation and raw data	Methodologies for conducting a topo survey using drone and RTK equipment	2024
	Manual on Inle Lake Basin Land Use Land Cover Analysis	Manual	Methodologies and procedures for satellite image and GIS analyses of the surface area of Inle Lake with the results of the assessment	2024
	Manual on Google Earth Engine Mosaic Image Preparation	Manual	Methodologies and procedures for satellite image and GIS analyses of land use of Inle Lake watershed with the results of the assessment	2024
	Manual on Gully Erosion Control Countermeasures	Manual	Methodologies and procedures for surveying, planning, designing, constructing and monitoring	2024

			of the gully erosion control measures	
	Safety Control Guideline on Gully Control Construction	Manual	Guidelines for safety control during the construction works of gully erosion control measures	2024
	3D Simulation Model of Gully Erosion Control Measures	Video clips	Introduction of the objectives, process, and expected results of the gully erosion control measures	2024
	Guidelines for Implementation of CF	Manual	Methodologies and procedures for new introduction of CF according to the CFI	2024
	11 Technical Materials on Agroforestry-related Techniques	Presentation	Methodologies and detailed technical specifications for development of agroforestry models	2024
	16 Technical Materials on Agriculture-related Techniques	Presentation	Methodologies and detailed technical specifications for horticulture (vegetable) production	2024

ANNEX 3: PDM (All versions of PDM)

ANNEX 4: R/D, M/M, Minutes of JCC (copy) (*)

ANNEX 5: Monitoring Sheet (copy) (*)

(Remarks: ANNEX 4 and 5 are internal reference only.)

Separate Volume: Copy of Products Produced by the Project

Annex 3 PDM (All versions of PDM)

Project Design Matrix (PDM)

Project Title: Capacity Building on Sustainable Natural Resource Management
Implementing Agency: Forest Department (FD), Ministry of Natural Resources and Environmental Conservation (MONREC)
Target Group: Relevant staff of FD, Forest Research Institute (FRI), Shan State Government, and Inle Lake Authority;
and target communities of Taunggyi District
Project Period: January 2018 - December 2022 (5 years)
Project Site: Nay Pyi Taw and Taunggyi District (Shan State)

Version: 1.0
Date: 8 August 2017

Narrative Summary	Objectively Verifiable Indicators (DRAFT)	Means of Verification	Important Assumption
Overall Goal			
Sustainable natural resource management providing multiple benefits is promoted.	- Any of the policy or planning framework referred to under the indicator of Project Purpose is implemented. - The rate of deforestation and forest degradation is reduced.	Myanmar government related document Report to UNFCCC	
Project Purpose			
National capacity for sustainable natural resource management is strengthened.	At least one item of the Project's outcomes developed/upgraded by the project for sustainable natural resource management is officially reflected to the policy or planning framework of the Government of Myanmar.	- Draft(s) of policy, plan etc. - Project completion report	No drastic changes in policy on natural resource management occur at least for 5 years after the end of the Project.
Outputs			
1 Capacity of forest management ¹⁾ is improved.	1.1 The number of community forests developed in the area where trained FD staff members are involved is increased by 20% compared to the one in 2016. 1.2 On average, at least 3 types of techniques and know-hows learned from the training are applied to the CFs by the trained FD staff members. 1.3 Two cases of external funds are facilitated by the Project for consideration within Myanmar Government.	- The proposal - Project completion report - CFDT training report	
2 Integrated watershed management in the Inle Lake watershed is improved.	2.1 JICA recommendation for integrated watershed management is incorporated into the Inle Lake Conservation Plan.	- Inle Lake conservation plan - Project completion report	
	2.2 At least 5 types of measures for better watershed management following the JICA recommendations in the project site are tested.	- Project completion report	
	2.3 The number of community forests developed in the Project site is increased at least by 20% compared to the one in 2016.	- Project completion report - An official letter on approval of the Plan	
	2.4 CF Guideline developed for Taunggyi is authorized by the FD and applied to all the FD township offices in the Inle Lake region.	- An official letter on approval of the Guideline - Project completion report and guideline as attachment to the District Forest Plan	

3 Scientific basis for biodiversity conservation is improved.	3.1 75% of specimens stored in the center is properly classified/categorized, preserved and managed.	- Project completion report	
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1) 'Management capacity' here denotes comprehensive capacity for managing required activities, including aspects related to planning, human resources, budget, knowledge and information, etc.

Activities	Inputs		Important Assumption
1.1 Review forestry related laws and/or policies, and support the improvement if necessary	[Japanese Side] 1 Dispatch of experts - Long-term: Chief Advisor/natural resource conservation policy, Project Coordinator - Short-term: 2 Training of relevant staff in Japan and/or other countries 3 Facility development - Biodiversity Specimen Center 4 Provision of necessary equipment (the order of priority will be discussed in the project) - Equipment necessary for the Biodiversity Specimen Center - Equipment necessary for forest, land and sediment monitoring - Equipment necessary in catchment works for reduction of soil erosion and sediment transport - Equipment necessary for education and training in villages for better management of the watershed 5 Local cost for the activities of Japanese experts	[Myanmar Side] 1 Assignment of counterpart personnel (C/P) 2 Suitable office space with necessary equipment for the Japanese experts 3 Budgetary arrangement (administration and operational costs)	No extreme climatic variability occurs.
1.2 Develop capacity of FD officers on promotion of community forest (and related topics such as watershed management and agroforestry) in conjunction with the Component 2			
1.3 Facilitate access to external funds in order to promote sustainable natural resources management			
1.4 Promote public relations on the Project			
2.1 Support institutional and financial arrangement for collaborative work among the governmental organizations, the Inle Lake Authority, and the other relevant stakeholders			
2.2 Carry out a baseline survey on the necessary fields such as land use, population, local livelihoods, household economy, and agriculture etc.			
2.3 Promote fact-based understanding of perceived phenomena			
2.4 Conduct demonstrative measures against key drivers of sedimentation			
2.5 Assess water quality in priority areas (activities are to be covered by an independent survey)			
2.6 Strengthen forest management in the watershed			
2.7 Incorporate findings into further policy and planning processes			
2.8 Carry out public relations and advocacy activities such as knowledge sharing workshop(s) with stakeholders such as local governments, NGOs and communities			
3.1 Construct a herbarium and biodiversity specimen center			
3.2 Develop database on the specimen stored in the center			
3.3 Enhance capacity for preservation and management of specimens collected from fields and stored in the center			

Project Design Matrix (PDM)**Project Title:** Capacity Building on Sustainable Natural Resource Management**Implementing Agency:** Forest Department (FD), Ministry of Natural Resources and Environmental Conservation (MONREC)**Target Group:** Relevant staff of FD, Forest Research Institute (FRI), Shan State Government, and Inle Lake Authority;
and target communities of Taunggyi District**Project Period:** 27 June 2018 - 26 June 2023 (5 years)**Project Site:** Nay Pyi Taw and Taunggyi District (Shan State)**Version: 1.1****Date: January 10th, 2019**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal			
Sustainable natural resource management providing multiple benefits is promoted.	- The rate of deforestation and forest degradation is reduced. - The Nationally Determined Contribution (NDC) of Myanmar is promoted (increasing area of Reserved Forest and Protected Public Forest to 30% and area of Protected Areas to 10% of national land for 2030).	Report to UNFCCC	
Project Purpose			
National capacity for sustainable natural resource management is strengthened.	At least one item of the Project's outcomes developed/upgraded by the project for sustainable natural resource management is officially reflected to the policy or planning framework of the Government of Myanmar.	- Draft(s) of policy, plan etc. - Project completion report	No drastic changes in policy on natural resource management occur at least for 5 years after the end of the Project.
Outputs			
1 Capacity of forest management ¹⁾ is improved.	1.1 The number of community forests developed in the area where trained FD staff members are involved is increased by 20% compared to the one in 2016.	- The proposal - Project completion report	
	1.2 On average, at least 3 types of techniques and know-hows learned from the training are applied to the SFM by the trained FD staff members.		
	1.3 Two cases of external funds are facilitated by the Project for consideration within Myanmar Government.		
2 Integrated watershed management in the Inle Lake watershed is improved.	2.1 JICA recommendation for integrated watershed management is incorporated into the Inle Lake Conservation Plan.	- Inle Lake conservation plan - Project completion report	
	2.2 At least 5 types of measures for better watershed management following the JICA recommendations in the project site are tested.	- Project completion report	
	2.3 The number of community forests developed in the Project site is increased at least by 20% compared to the one in 2016.	- Project completion report - An official letter on approval of the Plan	

	2.4 Action plan of District level Working Group for CF are approved and budgeted.	- Report from CFDWG - Taunggyi
3 Scientific basis for biodiversity conservation is improved.	3.1 75% of specimens stored in the center is properly classified/categorized, preserved and managed.	- Project completion report

1) 'Management capacity' here denotes comprehensive capacity for managing required activities, including aspects related to planning, human resources, budget, knowledge and information, etc.

Activities	Inputs		Important Assumption
1.1 Review forestry related laws and/or policies, and support the improvement if necessary	[Japanese Side] 1 Dispatch of experts - Long-term: Chief Advisor/Forest policy, Project Coordinator /Biodiversity conservation - Short-term: 2 Training of relevant staff in Japan and/or other countries 3 Facility development - Biodiversity Specimen Center 4 Provision of necessary equipment (the order of priority will be discussed in the project) - Equipment necessary for the Biodiversity Specimen Center - Equipment necessary for forest, land and sediment monitoring - Equipment necessary in catchment works for reduction of soil erosion and sediment transport - Equipment necessary for education and training in villages for better management of the watershed 5 Local cost for the activities of Japanese experts	[Myanmar Side] 1 Assignment of counterpart personnel (C/P) 2 Suitable office space with necessary equipment for the Japanese experts 3 Budgetary arrangement (administration and operational costs)	No extreme climatic variability occurs.
1.2 Develop capacity of FD officers on promotion of Sustainable Forest Management in conjunction with the Component 2			Pre-Conditions - A sufficient number of Project members are assigned for The Project implementation. - The security situations in Myanmar does not deteriorate. <Issues and countermeasures>
1.3 Facilitate access to external funds in order to promote sustainable natural resources management			
1.4 Promote public relations on the Project			
2.1 Support institutional and financial arrangement for collaborative work among the governmental organizations, the Inle Lake Authority, and the other relevant stakeholders			
2.2 Carry out a baseline survey on the necessary fields such as land use, population, local livelihoods, household economy, and agriculture etc.			
2.3 Promote fact-based understanding of perceived phenomena			
2.4 Conduct demonstrative measures against key drivers of sedimentation			
2.5 Strengthen forest management in the watershed			
2.6 Incorporate findings into further policy and planning processes			
2.7 Carry out public relations and advocacy activities such as knowledge sharing workshop(s) with stakeholders such as local governments, NGOs and			
3.1 Construct a herbarium and biodiversity specimen center			
3.2 Develop database on the specimen stored in the center			
3.3 Enhance capacity for preservation and management of specimens collected from fields and stored in the center			

Project Design Matrix (PDM)**Project Title:** Capacity Building on Sustainable Natural Resource Management**Implementing Agency:** Forest Department (FD), Ministry of Natural Resources and Environmental Conservation (MONREC)**Target Group:** Relevant staff of FD, Forest Research Institute (FRI), Shan State Government, and Inle Lake Authority;
and target communities of Taunggyi District**Project Period:** 27 June 2018 - 26 June 2024 (6 years)**Project Site:** Nay Pyi Taw and Taunggyi District (Shan State)**Version: 2****Date: July 6th, 2023**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal			
Sustainable natural resource management providing multiple benefits is promoted.	- The rate of deforestation and forest degradation is reduced. - The Nationally Determined Contribution (NDC) of Myanmar is promoted (increasing area of Reserved Forest and Protected Public Forest to 30% and area of Protected Areas to 10% of national land for 2030).	Report to UNFCCC	
Project Purpose			
National capacity for sustainable natural resource management is strengthened.	At least one item of the Project's outcomes developed/upgraded by the project for sustainable natural resource management is officially reflected to the policy or planning framework of the Government of Myanmar.	- Draft(s) of policy, plan etc. - Project completion report	No drastic changes in policy on natural resource management occur at least for 5 years after the end of the Project.
Outputs			
1 Capacity of forest management ¹⁾ is improved.	1.1 The number of community forests developed in the area where trained FD staff members are involved is increased by 20% compared to the one in 2016.	- The proposal - Project completion report	
	1.2 On average, at least 3 types of techniques and know-hows learned from the training are applied to the SFM by the trained FD staff members.		
	1.3 Two cases of external funds are facilitated by the Project for consideration within Myanmar Government.		
2 Integrated watershed management in the Inle Lake watershed is improved.	2.1 JICA recommendation for integrated watershed management is incorporated into the Inle Lake Conservation Plan.	- Inle Lake conservation plan - Project completion report	
	2.2 At least 5 types of measures for better watershed management following the JICA recommendations in the project site are tested.	- Project completion report	
	2.3 The number of community forests developed in the Project site is increased at least by 20% compared to the one in 2016.	- Project completion report - An official letter on approval of the Plan	

	2.4 Action plan of District level Working Group for CF are approved and budgeted.	- Report from CFDWG - Taunggyi	
3 Scientific basis for biodiversity conservation is improved.	3.1 75% of specimens stored in the center is properly classified/categorized, preserved and managed.	- Project completion report	
1) 'Management capacity' here denotes comprehensive capacity for managing required activities, including aspects related to planning, human resources, budget, knowledge and information, etc.			
Activities	Inputs		Important Assumption
1.1 Review forestry related laws and/or policies, and support the improvement if necessary	[Japanese Side] 1 Dispatch of experts - Long-term: Chief Advisor/Forest policy, Project Coordinator /Biodiversity conservation - Short-term: 2 Training of relevant staff in Japan and/or other countries 3 Facility development - Biodiversity Specimen Center 4 Provision of necessary equipment (the order of priority will be discussed in the project) - Equipment necessary for the Biodiversity Specimen Center - Equipment necessary for forest, land and sediment monitoring - Equipment necessary in catchment works for reduction of soil erosion and sediment transport - Equipment necessary for education and training in villages for better management of the watershed 5 Local cost for the activities of Japanese experts	[Myanmar Side] 1 Assignment of counterpart personnel (C/P) 2 Suitable office space with necessary equipment for the Japanese experts 3 Budgetary arrangement (administration and operational costs)	No extreme climatic variability occurs.
1.2 Develop capacity of FD officers on promotion of Sustainable Forest Management in conjunction with the Component 2			Pre-Conditions - A sufficient number of Project members are assigned for The Project implementation. - The security situations in Myanmar does not deteriorate. <Issues and countermeasures>
1.3 Facilitate access to external funds in order to promote sustainable natural resources management			
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2.3 Promote fact-based understanding of perceived phenomena			
2.4 Conduct demonstrative measures against key drivers of sedimentation			
2.5 Strengthen forest management in the watershed			
2.6 Incorporate findings into further policy and planning processes			
2.7 Carry out public relations and advocacy activities such as knowledge sharing workshop(s) with stakeholders such as local governments, NGOs and			
3.1 Construct a herbarium and biodiversity specimen center			
3.2 Develop database on the specimen stored in the center			
3.3 Enhance capacity for preservation and management of specimens collected from fields and stored in the center			