Government of Nepal

Ministry of Forests and Environment

Forest Research and Training Centre

Ecosystem and Forest Types Mapping Program (EFTMP)

A Brief Update Report

July 2021

1. Introduction

Characterization, classification, and mapping of ecosystems are the key to the sustainable management of biological diversity. In Nepal, several attempts have been made in this regard time and again. However, the vegetation maps prepared by Dobremez and his colleagues in the 1970s and 1980s have been the basis of all those efforts. The existing classifications of the ecosystem are based on limited field studies of vegetation composition and structure, and analysis of bioclimatic and ecological conditions. In this context, the Government of Nepal realized the need for standardizing the classification of Nepal's ecosystems and forest types, and update the related maps based on a comprehensive and systematic study.

In 2019, the Government of Nepal - Ministry of Forests and Environment (MoFE) initiated the Ecosystem and Forest Types Mapping Program (EFTMP) as a priority program and assigned the Forest Research and Training Center (FRTC) to manage it. Accordingly, a Technical Working Group (TWG), led by the Director-General of FRTC, was formed and the program design started in December 2019. The Program Design Document (PDD) was approved by MoFE in April 2020. Then, the preparatory activities for the program implementation were carried out, and the program implementation started in October 2020.

The UKAID's Policy and Institutions Facility (PIF), managed by Oxford Policy Management (OPM), and USAID's Hariyo Ban Program, managed by World Wildlife Fund (WWF), have provided technical and financial supports to the program in both program design and implementation phases. The support from the Hariyo Ban Program ended on April 30, 2021. This report presents a brief update on the progress of the program from the start of the design phase to its implementation until June 2021.

2. Objectives of the Program

The general objective of the EFTM Program is to inform decision-making regarding sustainable management of terrestrial and wetland ecosystems of Nepal, and thereby support local as well as national economies. In addition, it is expected to generate the information required to fulfill international obligations, such as reporting on the Aichi target # 14 of the Convention on Biological Diversity (CBD). The specific objectives of the Program are to:

a) Review the existing knowledge, data, and maps relevant to terrestrial and wetland ecosystems of Nepal;

b) Reclassify and delineate forest, grassland, agriculture, and wetland types and ecosystems, and produce appropriate maps;

c) Assess key threats and vulnerabilities to ecosystems and provide management prescriptions; and

d) Strengthen institutional capacity for monitoring ecosystems and updating ecosystem maps of Nepal.

3. Estimated cost and expenditure

The estimated cost of the Program according to the Program Design Document is NRs. 105,230,000 (equivalent to USD 857,480, as of 22/04/2020). Since the cost associated with the field survey is assumed to increase by NRs. 4,410,000, the revised estimated amount is NRs. 109,640,000 (equivalent to USD 920,880, as of June 30, 2021) (Annex 1).

WWF Hariyo Ban Program allocated NRs. 8,640,000 through two agreements with FRTC (Agreement # G174 and NP10849), of which NRs. 8,235,453 has been spent for the technical and commodity supports. No fund is further available from the WWF Hariyo Ban Program.

Policy and Institutions Facility (PIF) has allocated a total of GBP 300,000 (equivalent to NRs. 49,497,000, as of June 30, 2021) to this program, of which about GBP 90,000 (equivalent to NRs. 14,849,100) has already been spent, particularly for technical support. Thus, NRs. 34,647,900 is expected to be available from PIF for the program implementation.

The Government of Nepal (GoN) had allocated NRs. 500,000 in the Fiscal Year 2019/20, which was spent for office set up. In FY 2020/21, the GoN had allocated NRs. 5,000,000 for the implementation of this program, of which NRs. 2,756,843 has been spent for field survey (specifically vehicle arrangements), purchase of office accessories, and field data collection training. The remaining amount could not be spent because of the pause of the field survey and issues with equipment purchases due to the COVID-19 pandemic. The GoN has allocated NRs. 2,500,000 for the implementation of this program in the FY 2021/22.

The expenditure in the program implementation until June 2021 and the committed amounts for further use are given in Table 1.

Table 1: Expenditure in the EFTMP implementation until June 2021 and the remaining commitments

SN	Institution	Expenditure (NRs)	Remaining commitment (NRs)
1	The Government of Nepal		
	FY 2020/21	2,756,843	-
	FY 2021/22	-	2,500,000
2	USAID/Hariyo Ban Program	8,235,453	-
3	UKAID/Policy and Institutions Facility	14,849,100	34,647,900
	Total	**25,841,396**	**37,147,900**

As presented in Table 1, a total of NRs. 25,841,396 has been spent for the program implementation until June 2021, whereas a total of NRs. 37,147,900 (including PIF commitment and the GON budget for FY 2021/22) is available for further use. Thus, while considering the total estimated cost (revised) for the program implementation (NRs. 109,640,000), the program is short of NRs. 46,650,704 (equivalent to USD 312,009, as of June 30, 2021).

4. Accomplishments

4.1 During the program design and the preparation of implementation

During the program design and preparation of implementation, i.e. between December 2019 and October 2020, the following activities were carried out:

- ✓ Dr. Sunil Sharma, the Technical Advisor (for the program design), was taken on board to lead the process of program design. Dr. Sharma, in consultation with experts and stakeholders, prepared the Program Design Document (PDD) for the Ecosystem and Forest Types Mapping Program (EFTMP) in March 2019, and it was approved by the MoFE in April 2019.
- ✓ A consultation workshop with experts and stakeholders was organized (16 Jan 2020, Kathmandu) to discuss methodologies and processes of the ecosystem and forest types mapping of Nepal.
- ✓ A National Level Stakeholder Workshop was organized (16 Feb 2020, Nagarkot) to seek feedback on draft program design, including validation of methodologies and processes of the ecosystem and forest types mapping.
- ✓ Several Technical Working Group (TWG) meetings were organized to discuss and decide on various technical and managerial issues.
- ✓ The Technical Advisor (for the program implementation), thematic experts, i.e. Remote Sensing/Geographic Information System (RS/GIS) Specialist, Rangeland/Grassland Specialist, Wetland Specialist, and Agro-ecologist, and an Office Assistant were selected. Table 1 describes their details in brief.
- ✓ Office equipment and accessories, including computers and printers, were purchased.
- ✓ An office for the EFTMP was set up in the FRTC building in Babarmahal, Kathmandu.

4.2 During the program implementation

During the program implementation, i.e. between 28 October 2020 and 30 June 2021, the following activities were carried out:

- ✓ The Technical Advisor, who also works as a Forest Specialist, RS/GIS Specialist, Rangeland Specialist, Wetland Specialist, and Agro-ecologist reviewed literature relevant to respective components and prepared their typologies.

- ✓ Individual consultations with experts and stakeholders to discuss methodologies of ecosystem mapping were organized in all thematic components.
- ✓ An expert consultation workshop in each thematic component (i.e. forest and grassland, wetlands, and agriculture) was organized to discuss the proposed typology of landcover in each component and methodologies of cover type and ecosystem mapping.
- ✓ An inception report of the program, including detailed methodologies of cover type and ecosystem mapping in each component, has been prepared (first in Feb 2021, revised in Jul 2021).
- ✓ Field crew members, i.e. five Field Crew Leaders (forestry) and four Botanists/Taxonomists, have been hired (the Department of Plant Resources has provided a botanist/taxonomist).

- ✓ A meeting of the Program Coordination Committee (PCC) was organized on January 22, 2021, which discussed and decided on various managerial and technical issues.
- ✓ Several TWG meetings were organized to discuss and decide on various managerial and technical issues.
- ✓ A Standard Operating Procedure (SOP) for field data collection (that includes data collection procedures in all thematic components) and Field Data Collection Forms (for each component) have been prepared (first in Mar 2021, revised in Jul 2021).

- ✓ Four pilot field survey events were organized – 1) a three days-long event along Kathmandu – Chitwan – Siraha – Sindhuli – Kathmandu transect, 2) a one day-event in the northern aspect of Godawari forest, Lalitpur, 3) a one-day event in the southern aspect of Godawari forest, and 4) a 9 days-long event in the High Mountain Region in Humla district. Each pilot field survey provided inputs to improve and validate the proposed sampling design and data collection forms.
- ✓ Secondary information, such as the Forest Resource Assessment (FRA) data on forest types and several GIS layers, have been collected and processed for using them as input for mapping. Over 1400 signature points for forest types have been generated from the FRA plot-level data.

- ✓ A field data collection training was organized for field crew members, including field crew leaders, botanists/taxonomists, and intern students to be participating as forest technicians in the field crew. A total of 20 participants have been trained.
- ✓ Species Identification Manual for field data collection is in place.
- ✓ Office equipment and field accessories, including computers, GPS, clinometers, cameras, diameter tapes, sleeping bags, and field bags, have been purchased.
- ✓ The first field survey mission was operated between 2 and 21 April 2021. In this mission, five field crews collected data from over 300 sample points in forest, grassland, wetlands, and agriculture. Besides data itself, this first field survey mission also has provided inputs for managerial and technical improvements for the upcoming field missions.

4.3 Knowledge products/reports

The knowledge products/reports produced so far are presented in Table 2.

Table 2: Knowledge products/reports prepared until June 2021

SN	Product	Type	Status
1	EFTM Program Inception Report	Working Document	Completed
2	Standard Operating Procedures (SOP) for EFTMP Field Survey	Working Document	Completed
3	Vegetation Types of Nepal (A report based on review of literature and secondary data and expert consultation)	Review Report	Draft

4	Types of Wetlands in Nepal (A report based on review of literature and secondary data and expert consultation)	Review Report	Draft
5	Agro-ecosystem Types in Nepal (A report based on review of literature and secondary data and expert consultation)	Review Report	Draft
6	GIS and Remote Sensing Application for Mapping of Ecosystem and Forest Types in Nepal	Review Report	Draft
7	Training Report on Field Data Collection Training for Field Crew Members	Event completion report	Completed

5. Team members Engaged with EFTMP

A total of 16 team members (excluding government officials) have worked for EFTMP. Table 1 presents the list of team members and their roles in brief.

Table 1: EFTMP team members and their roles

SN	Name and Position	Roles	Remarks
Technical experts			
1	Dr. Sunil Sharma, Senior Technical Advisor - International	Advisory support to EFTMP through Technical Advisor	Working (with PIF)
2	Dr. Keshab Raj Goutam, Technical Advisor	Lead and manage the ecosystem mapping team, provide technical guidance to thematic experts, and work as a forest specialist, i.e., define forest types, design methodologies, and Standard Operating Procedure (SOP) for field data collection for forest types and ecosystem mapping and forest ecosystems' vulnerability assessment, analyze data (with data analyst), produce maps (with RS/GIS Specialist), and prepare relevant reports.	Working (with PIF)
3	Dr. Him Lal Shrestha, Remote Sensing/GIS Specialist	Collate relevant geo-spatial data, support preparing field data collection design and plans, develop and operate applications for reclassification, integration, and mapping of the forest, grassland, wetland, and agriculture types and ecosystems (with RS/GIS Programmer), prepare SOP for satellite image classification and mapping, produce forest, grassland, wetland, and agriculture type and ecosystem maps (with relevant thematic specialists), and prepare relevant technical reports.	Contract (with WWF) ended in March 2021, further contract is pending
4	Mr. Shailendra Kumar Pokharel, Wetlands Specialist	Define wetland types, collate secondary data, design methodologies and Standard Operating Procedure (SOP) for field data collection for wetland types and ecosystem mapping and wetland ecosystems' vulnerability assessment, analyze data (with data analyst), produce maps (with RS/GIS Specialist), and prepare relevant reports.	Contract (with WWF) ended in March 2021, further contract is pending
5	Dr. Govinda Basnet, Agro-ecologist	Define agriculture typology/agro-ecological zones, collate secondary data on agro-ecosystem classification, design methodologies and Standard Operating Procedure (SOP) for field data collection for	Worked (with PIF) until March 2021,

		agriculture types and ecosystem mapping and agro-ecosystems' vulnerability assessment, analyze data (with data analyst), produce maps (with RS/GIS Specialist), and prepare relevant reports.	further contract is pending
6	Dr. Chet Raj Upreti, Rangeland/Grassland Specialist	Define grassland types, collate secondary data, design methodologies and Standard Operating Procedure (SOP) for field data collection for grassland types and ecosystem mapping and grassland ecosystems' vulnerability assessment, analyze data (with data analyst), produce maps (with RS/GIS Specialist), and prepare relevant reports.	Worked (with PIF) until February 2021, further contract is pending
Field Crew			
7	Mr. Sunil Dhungana, Field Crew Leader (Forestry) [FCL]	Plan for and arrange the fieldwork, coordinate with local stakeholders, lead the field crew and collect/record data in the given data collection forms as per SOPs (for the forest, grassland, wetlands, and agriculture types and ecosystem mapping and ecosystem vulnerability assessment), enter or organize entering field data, and assist mapping of the forest, grassland, wetlands, and agriculture type and ecosystems.	Contract (with WWF) ended in April 2021, further contract is pending
8	Mr. Santosh Kumar Labh, FCL		
9	Mr. Prakash Adhikari, FCL		
10	Mr. Meghdut Chaulagain, FCL		
11	Mr. Pratap Sundar Shrestha, FCL		
12	Ms. Bina Wagle, Botanist/Taxonomist	As a team member of the field crew, assist planning and arranging fieldwork, collect biodiversity-related information as per SOPs, assist FCL to collect field data, including identifying plants, and enter data (with FCL).	Contract (with WWF) ended in April 2021, further contract is pending
13	Ms. Menuka Paudel, Botanist/Taxonomist		
14	Mr. Santosh Thapa, Botanist/Taxonomist		
15	Mr. Sangram Karki, Botanist/Taxonomist		
Office Management			
16	Mr. Madhab Paudel, Office Assistant	Assist Technical Advisor to manage office of Ecosystem Mapping Unit.	Contract (with WWF) ended in March 2021, further contract is pending

Note: Five BSc Forestry intern students were involved as Forest Technicians in the five field crews in their first field survey mission during 2-21 March, 2021.

6. Conclusion

Updating the Ecosystem and Forest Type Maps is a long-standing issue in Nepal for which the EFTM Program was designed. The Program implementation was delayed for about a year initially due to a long transition from its inception to the implementatio phase, whereas the second delay has occurred due to COVID-19 pandemic. However, a significant achievement has been made so far in terms of managerial activiteis, reviewing relevant literature, collection and analysis of secondary data, consultation with experts and stakeholders, and defining methodologies for land cover type and ecosystem mapping in each of the forest, grassland, wetlands, and agriculture components.

The preparatory activities have been accomplished, and the field survey has already started. However, the continuation of the field survey has been challenged by the COVID-19 pandemic. It has been paused

since May 2021. This may have impact on the timeline of the Program. Although the Program was initially desinged to be implemented in two years, i.e. up to October 2022, now it is assumed that it goes up to March 2023.

On the other hand, the lack of sufficient funds is another issue for the smooth implementation of the Program. The total cost estimated for the program implementation is NRs. 109,640,000. However, the available funds from Hariyo Ban Program, PIF, and the Government of Nepal seem to be insufficient. Therefore, NRs. 46,650,704 (equivalent to USD 391,825, as of June 30, 2021) needs to be managed in addition to the already committed amounts.

7. Way forward

The nationwide lockdown due to the COVID-19 pandemic has now been loosened. Therefore, it is expected that the field survey can resume after the rain, i.e. September 2021. All the fieldwork preparations will be done by then alongwith a revised fieldwork plan. Similarly, in the context of the delay in the field survey, a overall work shedule will be revised.

Regarding fund management, the Forest Research and Training Centre and/or the Ministry of Forests and Environment may need to hold dialogues with the Foreign, Commonwealth and Development Office (FCDO)/British Embassy, Kathmandu for the release of the committed amounts as well as further commitments. Similarly, in the context of the closure of the USAID Hariyo Ban Program, managed by WWF Nepal, it may be useful to hold talks with USAID and WWF Nepal regarding whether they are able to support the Program futher. It may also be necessary to dialogue with other donors/development partners to explore their interests to contribute to the Program. Likewise, the government commitment on the additional budget is also expected.

Annex 1: Detailed cost estimates for the program implementation

Position/Roles		Duration	Unit	Rates (NRs)	Total Cost (NRs)	Cost in %
Technical Team Renumeration	**No**				**32,920,000**	**31.28%**
1. Technical Advisor	1	**24**	**Months**	300000	7,200,000	
2. RS/GIS Specialist	1	**24**	**Months**	200000	4,800,000	
3. GIS/RS Programmer	1	**4**	**Months**	200000	800,000	
4.Data Analyst	1	**4**	**Months**	150000	600,000	
5. Wetland Specialist	1	**10**	**Months**	150000	1,500,000	
6. Agri-ecologist	1	**10**	**Months**	150000	1,500,000	
7. Rangeland Specialist	1	**4**	**Months**	150000	600,000	
8.International Expert (Review, Mentoring & Capacity building)	1	**60**	**days**	60000	3,600,000	
Field Team Renumeration						
1. Crew Leader - Forestry	5	**15**	**Months**	80000	6,000,000	
2. Botanist/Taxonomist for forestry team	5	**15**	**Months**	80000	6,000,000	
3. Botanist/Taxonomist for wetland team	1	**4**	**Months**	80000	320,000	
Local Support Crew Renumeration					0	**0.00%**
1. Local Staff for forestry team	5	**15**	**Months**		0	
2. Local Res. Person for forestry team	5	**15**	**Months**		0	
3. Local Assistant for forestry team	5	**15**	**Months**		0	
4. Local Staff for Agri and wetland field team	2	**4**	**Months**		0	
5. Local Res. Person Agri and wetland field team	2	**4**	**Months**		0	
6. Local Assistant Agri and wetland field team	2	**4**	**Months**		0	
Expert Reviewer Renumeration					**660,000**	**0.63%**
1.Expert-Forest types and Ecosystem	1	**1**	**Months**	200000	200,000	
2.Expert-Agro-Ecosystem	1	**0.5**	**Months**	200000	100,000	
3.Expert-Wetland Ecosystem	1	**0.5**	**Months**	200000	100,000	
4.Expert-Rangeland Ecosystem	1	**0.5**	**Months**	200000	100,000	
5.Expert Panel Engagement	20	20	Days	8000	160,000	
Field Work (DSA Accomodation and hardship allowance)					**35,255,000**	**33.50%**
1. Technical Advisor	1	40	Days	5000	200,000	
2. RS/GIS Specialist	1	36	Days	5000	180,000	
3. Wetland Specialist	1	84	Days	5000	420,000	
4. Agro-ecologist	1	84	Days	5000	420,000	
5. Rangeland specialist	1	30	Days	5000	150,000	
6. Crew Leader - Forestry	5	1575	Days	5000	7,875,000	
7. Botanist/Taxonomist for forestry team	5	1575	Days	5000	7,875,000	
8. Botanist/Taxonomist for wetland team	1	84	Days	5000	420,000	
9. Local Staff for forestry team	5	1575	Days	2000	3,150,000	
10. Local Res. Person for forestry team	5	1575	Days	1500	2,362,500	
11. Local Assistant for forestry team (Labor/Porter)	5	1575	Days	1500	2,362,500	
12. Local Staff for Agri and wetland field team	2	168	Days	2000	336,000	
13. Local Res. Person Agri and wetland field team	2	168	Days	1500	252,000	
14. Local Assistant Agri and wetland field team (Labor/Porter)	2	168	Days	1500	252,000	
15.E&FT Mapping Coordinator	1	360	Days	5000	1,800,000	
16.Asst Survey Officer	2	360	Days	5000	3,600,000	
17.Asst Remote Sensing Officer	2	360	Days	5000	3,600,000	
Travel					**20,375,000**	**19.36%**
1.Air travel (national)		1	LS	400000	400,000	
2.Vehicle hire + fuel		2350	Days	8500	19,975,000	

Training, Workshops and Meetings					**3,560,000**	**3.38%**
1.Field data and information collection Training (2 days 20 people field based)		1	Times	400000	400,000	
2.Team building and field Experience sharing workshop (30 people, 1 day)		3	Times	300000	900,000	
3.Expert Panel Meetings (10 people, 1 day)		4	Times	35000	140,000	
4.Program Coordination Committee		6	Times	50000	300,000	
5.Program Advisory Meeting		4	Times	75000	300,000	
6.Threat, Risk and Vulnurability Assessment, Consultation & Workshop		LS		500000	500,000	
7.TWG Meeting		24	Times	30000	720,000	
8.Dissimination Workshop		1	Times	300000	300,000	
Equipment					**2,180,000**	**2.07%**
1.Camera with GPS		7	unit	50000	350,000	
2.D-Tape		14	unit	5000	70,000	
3.Sunnto-clinometer		7	unit	35000	245,000	
4.Measuring Tape		14	unit	2500	35,000	
5.Basic laptop		7	unit	140000	980,000	
6.Inventory Forms Printing		1	unit	150000	150,000	
7.A set of Vegetation Identification book and field manual		7	unit	50000	350,000	
Field Gear					**1,390,000**	**1.32%**
1.Field Gear to each crew member		23	set	30000	690,000	
2. Tents,Torch, cooking utensils		LS	LS	7000000	700000	
Publication					**500,000**	**0.48%**
Report publication			LS	500000	500,000	
Infrastructure					**8,390,000**	**7.97%**
1.Cloud server set and maintenance			LS	200000	200,000	
2.Mapping unit management cost (Communication, Internet,Toner,Paper etc.)		1	unit	1190000	1,190,000	
3.Developing cloud based database system and maintenance				5000000	5,000,000	
4. Software,hardware and it's accessories			LS	2000000	2000000	
		Total			**105,230,000**	NRs
		Exchange Rate 22 April 2020		122.72	857,480	US$

Note: The above details is from the Program Design Document. During the development of detailed methodology, it was realized that a 'Forest Technician' is to be included in each forest and grassland field crew (total 5 persons) and thus included in the SOP for field survey. It was not considered by the Program Design Document. Therefore, the total estimate is increased by the estimated cost associated with this (5 persons*14 months*21 days/month*NRs.3000 per day = NRs. 4,410,000), making the revised total estimate to be NRs. 109,640,000 (equivalent to USD 920,880, as of June 30, 2021).