RECAP4NDC Project

CAPACITY BUILDING FOR FOREST LANDSCAPE RESTORATION IN MAHARASHTRA: A KEY STAKEHOLDER-BASED TRAINING NEEDS ASSESSMENT

INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION, DEHRADUN

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Capacity Building for Forest Landscape Restoration in Maharashtra: A Key Stakeholder-Based Training Needs Assessment

Output-V: Development of Capacities, Knowledge and Communication Mechanisms for Forest Landscape Restoration

Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) Project

INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION

(An Autonomous Council of the Ministry of Environment, Forest and Climate Change, Government of India)

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FOREWORD

The threat of global climate change is both real and increasingly evident, impacting nature and humanity alike. Forests play a crucial role in maintaining ecological balance, environmental stability, sustainable development and essential ecosystem services. One of the greatest challenges facing humanity is managing natural resources in a way that meets growing human demands while preserving the health and resilience of ecosystems.

I have had the opportunity to witness first-hand the significant efforts invested in the Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) Project. This report on training needs assessment is of critical importance, as it provides valuable insights into the capacity gaps identified within the State Forest Department, Other Line Departments and Local Communities of Maharashtra in relation to forest landscape restoration. The findings from the Training Needs Assessment will play a key role in designing effective capacity-building modules and developing appropriate training manuals on forest landscape restoration and related topics for capacity development under Output V: Development of Capacities, Knowledge and Communication Mechanisms for Forest Landscape Restoration of the RECAP4NDC Project being implemented by ICFRE in collaboration with ICIMOD and GIZ.

Development of capacities, knowledge and communication mechanisms for Forest Landscape Restoration (FLR) is a key component of the RECAP4NDC Project, aimed at achieving the forest sector targets under the Nationally Determined Contributions, Land Degradation Neutrality targets, the Bonn Challenge and the Sustainable Development Goals. This report represents the culmination of several months of dedicated field research, including interviews with officers and staff of the State Forest Department, other line departments and members of local communities across Maharashtra. It presents a comprehensive analysis of the data collected from the field and provides valuable insights into the training and capacity-building needs of these stakeholders. The findings highlight the critical areas where capacity building is needed to effectively implement FLR activities in the state. This report also offers practical recommendations to support future actions for building institutional and community-level capacities, ultimately contributing to the successful realization of FLR-related programmes and projects.

I am pleased to present this report on 'Capacity Building for Forest Landscape Restoration in Maharashtra: A Key Stakeholder-based Training Needs Assessment'. I hope this report will inspire further discussion and concrete action to address the capacity-building needs essential for effective FLR, while also strengthening existing institutions to achieve the desired outcomes.

I commend Dr. R. S. Rawat, Principal Investigator and team of RECAP4NDC Project of ICFRE for bringing out this key stakeholder-based training needs assessment report for the state of Maharashtra.

Date: 30 June 2025

(Kanchan Devi)

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

AGB	Above Ground Biomass
BGB	Below Ground Biomass
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CASFOS	Central Academy for State Forest Service
CBD	Convention on Biological Diversity
CSO	Civil Society Organization
DPDC	District Planning and Development Committee
EGS	Employment Guarantee Scheme
FCM	Forest Cover Map
FDA	Forest Development Agency
FDCM	Forest Development Corporation of Maharashtra
FGD	Focus Group Discussion
FLR	Forest Landscape Restoration
FPO	Farmers Producer Organization
FSI	Forest Survey of India
GCP	Green Credit Programme
GIM	Green India Mission
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GOI	Government of India
ha	Hectare
HH	Household
ICFRE	Indian Council of Forestry Research and Education
ICIMOD	International Centre for Integrated Mountain Development
IEC	Information, Education and Communication
ISFR	India State of Forest Report
IUCN	International Union for Conservation of Nature
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
MAP	Massive Afforestation Program
MDF	Moderately Dense Forest

mha	Million Hectares
MGNEGA	Mahatma Gandhi National Rural Employment Guarantee Act
NAFCC	National Adaption Fund for Climate Change
NCR	National Capital Region
NDC	Nationally Determined Contributions
NDDB	National Dairy Development Board
NGO	Non-Governmental Organization
NLM	National Livestock Mission
NRM	Natural Resource Management
NWFP	Non- Wood Forest Products
OF	Open Forest
RDF	Rehabilitation of Degraded Forest
RECAP4NDC	Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India
REDD+	Reducing Emissions from Deforestation and Forest Degradation, Sustainable Management of Forests and the Conservation and Enhancement of Forest Carbon Stocks
RFA	Recorded Forest Area
SDG	Sustainable Development Goals
SFD	State Forest Department
SFS	State Forest Service
SHG	Self Help Group
SLEM	Sustainable Land and Ecosystem Management
SMC	Soil & Moisture Conservation
SOC	Soil Organic Carbon
Sq km	Square Kilometer
TERI	The Energy and Resources Institute
TGA	Total Geographical area
TNA	Training Needs Assessment
TOF	Tree Out Side Forest
VDF	Very Dense Forest

EXECUTIVE SUMMARY

Forests in India play a vital role in supporting the economy, livelihoods and ecological stability. Forests support the livelihoods of about 300 million people including tribal communities who rely on forest produce such as fuelwood, bamboo, medicinal plants, etc. Recognizing the importance of forests, India has set ambitious national target of increasing forest and tree cover to 33% of its geographical area and creating an additional carbon sink of 2.5 – 3.0 billion tonnes of CO_2 equivalent through additional forest and tree cover under its Nationally Determined Contributions. India is committed to the international conventions like the United Nations Framework Convention on Climate Change, United Nations Convention to Combat Desertification, Convention on Biological Diversity, Sustainable Development Goals and also the Bonn Challenge pledge. These commitments underscore the central role of forests in India's strategy for sustainable development and climate resilience. Competing uses of land for agriculture, infrastructure development, human settlement and industries exerts tremendous pressure on the forests. Rising atmospheric carbon dioxide concentration and climate change are additional stress on the forests and making them more vulnerable. Despite these challenges, India is pursuing to achieve its national targets and international commitments related to forests and environment. To fully realize the potential of forests in meeting the national targets and international commitments, it is essential to strengthen forest governance, invest in forest landscape restoration and promote meaningful community participation for achieving national targets and international commitments related to forests and environment.

Several programmes and projects are being implemented in the country that integrate ecological restoration, biodiversity conservation, socio-economic development, robust policy frameworks and advanced monitoring technologies. An Indo-German Cooperation project titled 'Restore, Conserve and Protect Forest and Tree Cover for Nationally Determined Contributions Implementation in India (RECAP4NDC)' is being implemented in the selected landscapes of Delhi and National Capital Region, Uttarakhand, Maharashtra and Gujarat. RECAP4NDC Project empowering the stakeholders to effectively plan, finance, implement and monitor initiatives related to forest landscape restoration in project area. Development of capacities, knowledge and communication mechanisms for forest landscape restoration is one of the components of the RECAP4NDC Project. ICFRE is mainly responsible for execution of this component along with ICIMOD and GIZ.

A comprehensive training needs assessment (TNA) on forest landscape restoration was conducted for the State Forest Department, Other Line Departments and local communities of Maharashtra. The objective of the TNA was to identify gaps in the knowledge and capacity of key stakeholders regarding forest landscape restoration (FLR) and to develop targeted training modules to address identified gaps for the successful implementation of FLR initiatives in the State of Maharashtra.

The findings of TNA highlight the significance of focused, practical, and interactive trainings to fill in the knowledge gaps with particular reference to the value chain of NWFPs, domestic and international funding for FLR, forest carbon stocks, carbon market, forest certification, spring shed management, Green Credit Programme, REDD+, gender mainstreaming in forest management and ecotourism as prioritized by the officers. The frontline staff of State Forest Department prioritized spring shed management, India's NDC targets in Paris Agreement, forest carbon stocks, sustainable harvesting of NWFP and their role in livelihood generation, gender mainstreaming in forest management, community forest management, ecotourism, policies, laws and regulations for conservation of forest biodiversity in India and Legal framework for conservation and protection of forest and environment in India. Capacity building of the Other Line Departments is required to be done on invasive species and their management, spring shed management, legal framework for

conservation and protection of environment in India, gender mainstreaming in natural resource management, international Agreement/ Conventions related to environment, ecotourism, disaster management/ disaster risk reduction and LiFE style for environment and sustainable development goals.

The findings of TNA highlight the significance of focused, practical and interactive trainings to fill in the knowledge gaps with particular reference to the local communities of Maharashtra on horticulture/agriculture practices, sustainable land management practices, soil and water conservation, livelihood generation through non-wood forest products, restoration of degraded forest landscape, agroforestry/ farm forestry practices, forest fire management, disaster risk management, community forest management, climate change and its impacts, climate change mitigation and adaptation, human wildlife conflicts and invasive alien species management.

The development of comprehensive and targeted training modules on FLR is essential for effective capacity building of key stakeholders of Maharashtra State. Enhanced capacity of the stakeholders will contribute to the restoration of degraded forest landscapes, promote ecosystem-based approaches and ensure the delivery of essential ecosystem services such as water regulation, carbon sequestration and biodiversity conservation. Moreover, strengthening the capacity of key stakeholders will support the development of climate-resilient forest landscapes. This will not only help in mitigating the impacts of climate change but also help in enhancing the resilience of local communities and improve their access to sustainable livelihood opportunities. Therefore, need-based training modules on FLR are being developed for capacity building of the State Forest Department, Other Line Departments and local communities of Maharashtra State under the RECAP4NDC Project.

1   INTRODUCTION

As per the India State of Forest Report 2023, total forest cover of the country is 715342.61 sq km (21.76% of the total geographical area) and total tree cover of the country is 112014.34 sq km (3.41% of the geographical area). The total forest and tree cover of the country is 25.17% (827356.95 sq km) of its total geographical area. Forest and tree cover play a vital role in ecological and economic development of the country. While their direct contribution to gross domestic product is around 1.7% and this figure underrepresents the real value of the forests, as it excludes the contribution of ecosystem services like carbon sequestration, water regulation and soil conservation and non-wood forest products. Forests support the livelihoods of about 300 million people including tribal communities who rely on forest products such as fuelwood, bamboo, medicinal plants, etc. Recognizing the importance of forests, India has set ambitious national target of increasing forest and tree cover to 33% of its geographical area under the National Forest Policy 1988, and creating an additional carbon sink of 2.5-3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030 under its Nationally Determined Contributions. India is committed to the international conventions like the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), Convention on Biological Diversity (CBD), Sustainable Development Goals (SDGs) and also the Bonn Challenge pledge. These commitments underscore the central role of forests in India's strategy for sustainable and climate resilience development.

Competing demands of land for agriculture, infrastructure development, human settlement and industrial expansion exert immense pressure on the forests. Rising atmospheric carbon dioxide concentration and climate change are additional stress on the forests and making them more vulnerable to climate change. Despite these challenges, India remains committed to achieving its national targets and international commitments related to forests and environment. The Government of India is implementing a range of programmes and projects that focus on restoration of degraded forests, biodiversity conservation, socio-economic development, robust policy frameworks, and use of advanced monitoring technologies.

To fully realize the potential of forests in achieving national targets and fulfilling international commitments, it is essential to strengthen forest governance, invest in forest landscape restoration and promote meaningful participation of the local communities. These measures are crucial for ensuring the climate resilience and long-term sustainability of India's forest ecosystems.

2   OVERVIEW OF MAHARASHTRA STATE

Maharashtra, located in the western peninsular region of India, is one of the country's most significant states in terms of geography, population and development. It spans an area of 307,731 sq km, making it the third-largest state of the country and accounting for 9.4% of the nation's total geographical area. According to the Census, 2011, it is the second most populous state with approximately 112 million people. Geographically, Maharashtra is bordered by the Arabian Sea to the west; Karnataka and Goa to the south; Telangana to the southeast; Chhattisgarh to the east; Gujarat and Madhya Pradesh to the north; and the union territory of Dadra and Nagar Haveli and Daman and Diu to the northwest. Administratively, Maharashtra is divided into six revenue divisions: Konkan, Pune, Nashik, Aurangabad, Amravati and Nagpur. These divisions are further subdivided into 36 districts, each equipped with planning and administrative mechanisms to facilitate effective governance and local development. This division-based structure allows the state to maintain robust governance across its vast and varied territory. Mumbai serves as the capital of Maharashtra and is also the financial hub of India. Historically a major port, Mumbai has grown into the country's most populous urban center, renowned for its economic diversity, well-developed infrastructure, and strategic importance in trade and commerce. Nagpur, centrally located within the state, functions as the winter capital and plays a key role in administrative and logistical operations. Economically, Maharashtra is one of the most industrialized and economically advanced states of the country. It leads in several sectors including agriculture, manufacturing, trade, transport and education. The state hosts numerous industrial

zones and infrastructure projects, making it a preferred destination for both domestic and foreign investment. The presence of a strong educational ecosystem also supports its skilled workforce and innovation capacity.
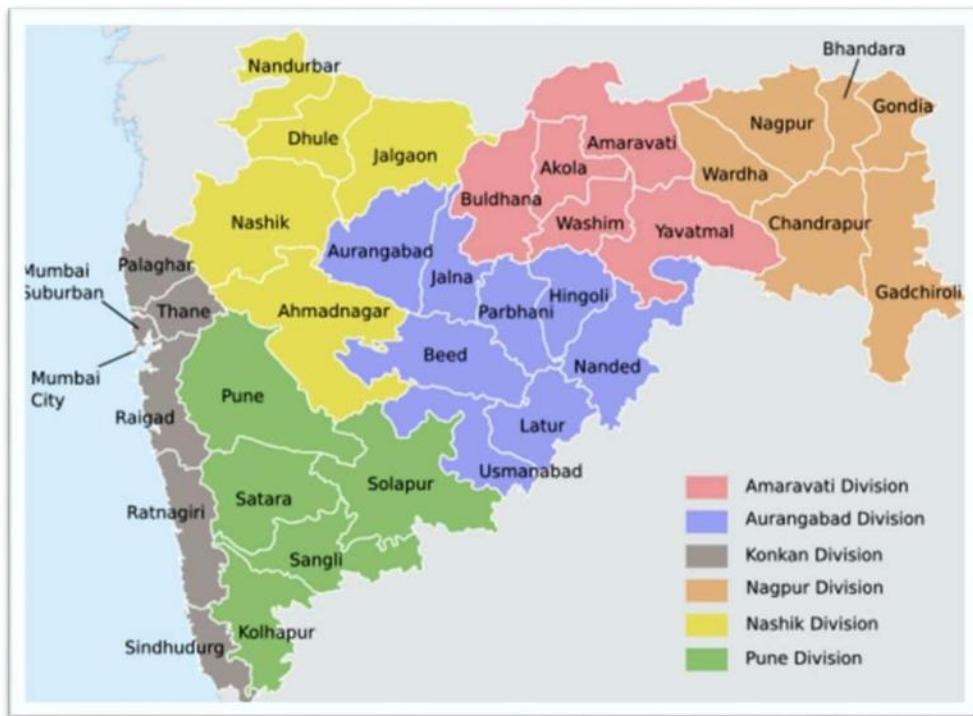
Fig. 1: Administrative map of Maharashtra

| 3 | FORESTS AND TREE COVER |

As per the India State of Forest Report 2023, recorded forest area of Maharashtra state is 61,952 sq km, accounting for 20.13% of the state's total geographical area and 7.99% of India's national recorded forest area. Maharashtra has a total forest cover of approximately 50,858.53 sq km, which constitutes about 16.53% of the state's geographical area. This makes Maharashtra the third-largest state of the country in terms of total forest area. The forest cover is categorized into Very Dense Forest, Moderately Dense Forest and Open Forest, accounting for roughly 19.4%, 42.43%, and 38.17% of the total forest area, respectively. Additionally, Maharashtra has the highest tree cover in the country with 14,524.88 sq km which is 4.72% of its geographical area. The state also has a mangrove cover of approximately 315 sq km, which has shown an increase of about 12.39 sq km since the previous assessment of 2021. The state also has the third largest bamboo bearing area of 13,572 sq km (FSI, 2024). Despite these gains, Maharashtra's forest cover remains significantly below the national target of 33%, highlighting the need for continued conservation and restoration efforts.

Table 1: Forest Cover of Maharashtra

Density Class	Area (sq km)	% of Geographical Area
Very Dense Forest	9,865.62	3.21
Moderate Dense Forest	21,577.79	7.01
Open Forest	19415.12	6.31
Total	**50858.53**	**16.53**
Scrub	3645.67	1.18

Source: FSI, 2024
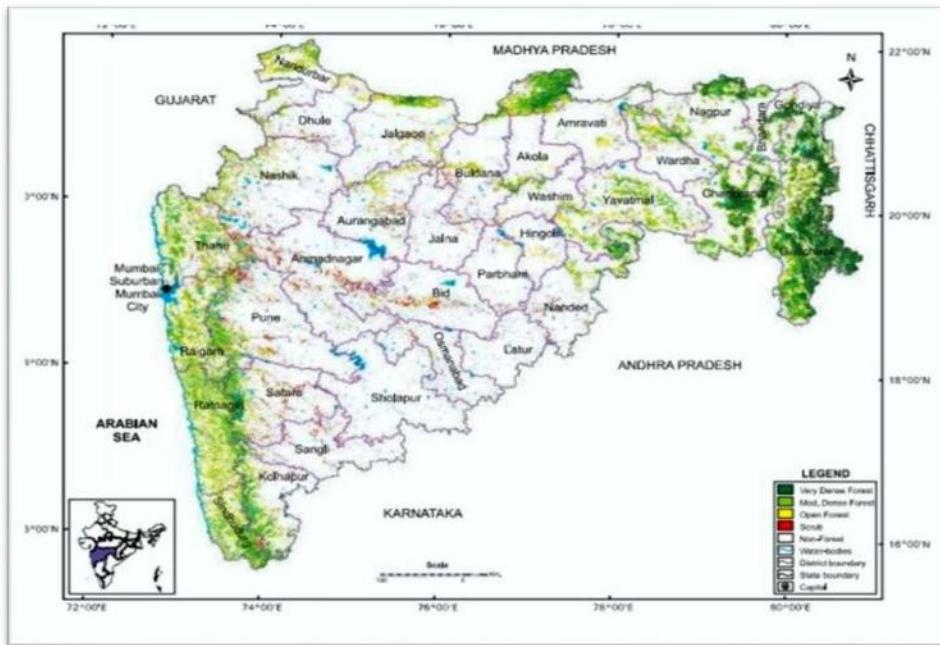
Fig. 2: Forest Cover Map of Maharashtra   Source: FSI, 2024

The area under different Forest Types in Maharashtra (as per the Champion and Seth Forest Classification, 1968), is presented in Table 2.

Table 2: Different Forest Types in Maharashtra

S. No.	Forest Type	Area (sq. km.)	Percentage of total mapped Area
1	2A/C2 West Coast Semi Evergreen Forest	6620.62	12.15
2	3B/C1b Moist Teak Forest	5546.58	10.18
3	3B/C2 Southern Moist Mixed Deciduous Forest	11312.50	20.75
4	4A/L1 Littoral Forest	0.75	0.00
5	4B/TS1 Mangrove Scrub	23.72	0.04
6	4E/TS2 Mangrove Forest	271.02	0.50
7	4E/RS1 Riparian Fringing Forest	0.93	0.00
8	5A/C1b Dry Teak Forest	9405.86	17.26
9	5A/C3 Southern Dry Mixed Deciduous Forest	14286.39	26.21
10	5/DS1 Dry Deciduous Scrub	4509.36	8.27
11	5/E2 *Boswellia* Forest	43.15	0.08
12	5/E3 Babul Forest	11.00	0.02
13	5/E4 *Hardwickia* Forest	61.02	0.11
14	5/E5 *Butea* Forest	9.81	0.02
15	5/E9 Dry Bamboo Brakes	253.11	0.46
16	6A/C1 Southern Thorn Forest	215.54	0.40
17	8A/C2 Western Subtropical Hill Forest	645.88	1.19
	Sub Total	**53217.24**	**97.64**
18	TOF / Plantation	1286.96	2.36
	Total (Forest Cover & Scrub)	**54504.20**	**100.00**

Source: FSI, 2024

4   LAND USE PATTERN

Maharashtra is predominantly covered by black cotton soil, which is highly suitable for agriculture due to its excellent moisture-retention capacity. The state experiences a tropical monsoon climate characterized by hot summers, cool winters and considerable variability in monsoon rainfall across different regions. The net area sown dominates land use, accounting for over half of the state's reported land area. The forest area is about 17%, reflecting both protected, reserves and community forests. Fallow lands (current and other) together comprised nearly 8% of the land, indicating fallow-to-cropland rotations and shifts in cropping intensity. The recent trends in land use changes display that land for non-agricultural uses has risen significantly in recent years. Miscellaneous tree crops and groves have expanded slightly, reflecting growth in agroforestry and orchard areas. Both current fallows and other fallows registered higher growth and greater year-to-year instability compared to other categories. The net area sown, forest cover, permanent pastures and grazing land, cultivable waste land, and barren/unculturable land have all declined over the same period. The various land use types in the State are given in Table 3.

Table 3: Land use types in Maharashtra

S. No.	Land Use Types	Area (in Th. Ha)	Percentage
1	Geographical area	30,771	
2	Reporting area for land Utilization	30,758.20	100
3	Forests	5209.00	16.94
4	Not available for land cultivation	3719.00	12.09
5	Permanent Pastures and Grazing Lands	1364.00	4.43
6	Land under miscellaneous tree crops and groves	274.10	0.89
7	Culturable wasteland	943.50	3.07
8	Fallow land other than current fallows	1202.70	3.91
9	Current fallows	1455.50	4.73
10	Net area sown	16590.40	53.94

Source: FSI, 2024

5   FLORAL AND FAUNAL DIVERSITY

Maharashtra state rich floristic wealth reflects its varied topography and climate across nine agro-climatic zones such as South Konkan Coastal Zone, North Konkan Coastal Zone, Western Ghat Zone, Sub-Montane Zone, Western Maharashtra Plain Zone, Western Maharashtra Scarcity Zone, Central Maharashtra Plateau Zone, Central Vidarbha Zone, and Eastern Vidarbha Zone. Vegetation ranges from coastal mangroves to dry thorn scrub. Maharashtra has approximately 3,225 species of flowering plants, belonging to 1,082 genera and 181 families. The state is home to 25 genera and 694 species of plants that are endemic to India. The Western Ghats region, particularly the Khandala area, is known for its rich flora, including numerous trees, shrubs, climbers and herbs. Maharashtra has a significant mangrove cover, with 20 out of the 60 mangrove species found globally, and a 72% increase in mangrove cover in the last decade. Forests of Maharashtra are having various types of timber yielding as well as species having medicinal values.

The entire forest area is having ample number of wild animals and is rich in bio-diversity. Maharashtra's faunal diversity is equally diverse, encompassing various mammals, birds, reptiles, amphibians and marine fauna including amphibians, fish, turtles, hawksbill turtles, leatherback turtles and olive ridley turtles. Common mammals include Bengal tiger, leopard, wild dog, sloth bear, Indian bison, sambar, four-horned antelope, chinkara, bonnet monkey, nilgai and blackbuck. Maharashtra is home to various bird species, including the yellow-footed green pigeon, broad-tailed grass bird, blue-winged parakeet, and grey hornbill.

6 FOREST CARBON STOCKS

Maharashtra's forest carbon stocks as per the India State of Forest Report 2023 is estimated at 465 million tonnes of carbon, equivalent to approximately 1,705 million tonnes of CO_2 eq. The initiatives, such as the National Afforestation Programme and Green India Mission, expanded forest and tree cover, which has helped in boosting above-ground biomass and soil carbon pools. Community-based forest management, fire-control measures and restoration of degraded lands enhanced carbon retention in both reserved and non-reserved forests. The adoption of mixed-species agroforestry practices on forest fringe lands has increased overall woody biomass, contributing to gradual carbon stock gains annually. Forest carbon stocks of Maharashtra in different pools is given in the Table 4.

Table 4: Forest carbon stock in Maharashtra in different pools

Area (Sq Km)	Carbon Stocks (in thousand tonnes)					
	AGB	BGB	Dead wood	Litter	SOC	Total
50,859	1,43,901 (28.29)	44,265 (8.70)	3,245 (0.64)	10,012 (1.97)	2,63,259 (51.76)	4,64,682 (91.36)

AGB: Above Ground Biomass, BGB: Below Ground biomass and SOC: Soil Organic Carbon   Source: FSI, 2024

7 LAND DEGRADATION, DESERTIFICATION AND DROUGHT

The 'Desertification and Land Degradation Atlas of India' highlighted that Maharashtra state is experiencing significant land degradation. An analysis of land degradation in the state of Maharashtra indicates that 46.49% of the state's total geographical area (approximately 14.30 mha) was affected by desertification and land degradation during 2018-19. The most significant contributor to land degradation in the state is water erosion, which affected 26.70% of the geographical area in 2018–19. This is followed by vegetation degradation and impacting 16.71% of the land. Both forms of degradation have shown a steady increase over the years. Between 2011–13 and 2018–19 (SAC, 2021), forest areas saw a notable rise in vegetation degradation (Fig. 3).
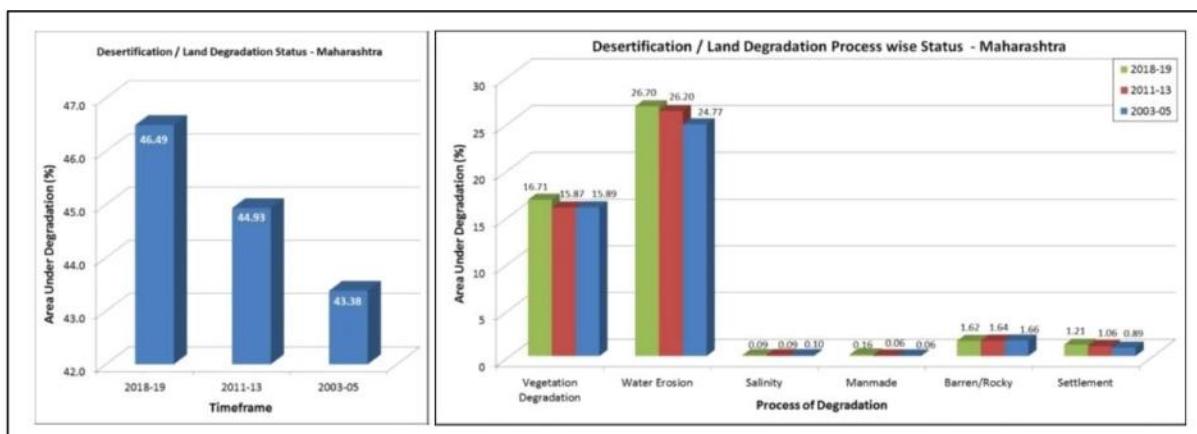
Fig. 3: Status of desertification and land degradation in Maharashtra   Source: SAC, 2021

The persistence of this trend suggests that soil conservation and land-use practices have not sufficiently adapted to changing climatic and anthropogenic pressures. These patterns of degradation point to the urgent need for comprehensive and sustainable land and water management strategies. Addressing the root causes particularly soil erosion and vegetation loss is essential for safeguarding Maharashtra's agricultural productivity, ecological balance and long-term resilience to climate change. Without timely interventions, the land degradation is likely to intensify, further threatening the livelihoods of millions and the sustainability of the state's natural resources.

8 FOREST FIRES

According to the India State of Forest Report 2023, about 16,008 forest fires were detected during the year 2023-24 in the state of Maharashtra. The rugged terrain creates access limitations, preventing rapid initial mitigation efforts by firefighting teams. The Maharashtra Forest Department has implemented technological counter measures. The details of Fire-Prone Forest Areas under different classes are given in Table 5 and Figure 4.

Table 5: Fire-Prone Forest Areas under different forest classes

S. No.	Forest Fire - Prone Class	Forest Cover Including Scrub (sq.km)	Percentage of Total Forest Cover
1.	Extremely fire-prone	1508.20	2.77
2.	Very highly fire-prone	6855.38	12.57
3.	Highly fire-prone	10393.30	19.07
4.	Moderately fire-prone	11128.85	20.42
5.	Less fire-prone	24620.47	45.17
	Total	**54504.20**	**100.00**

Source: FSI, 2024
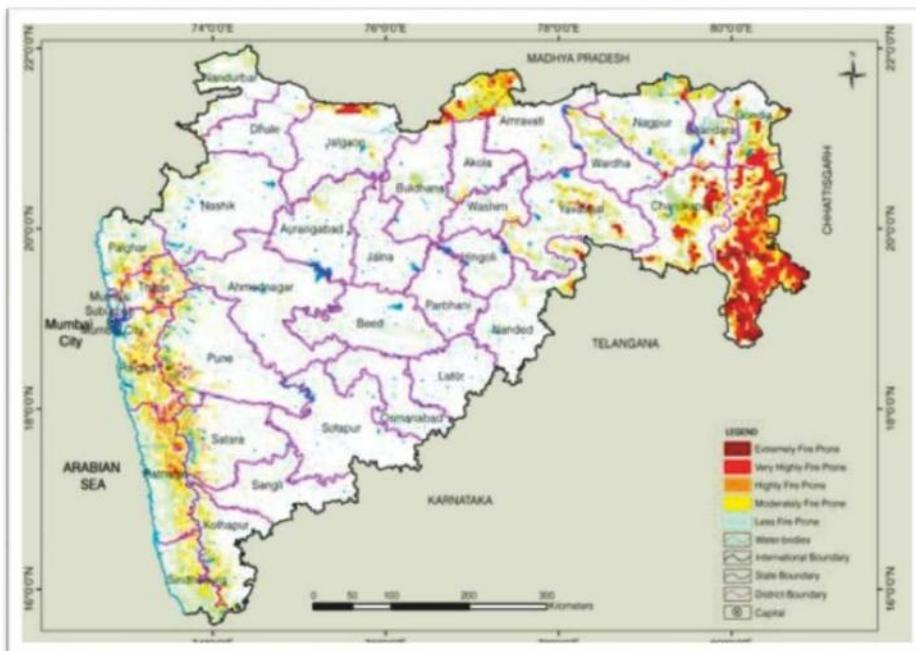
Source: FSI, 2024

Fig. 4: Map showing fire-prone forest areas under different classes

9 PROGRAMMES/PROJECTS ADDRESSING THE FOREST DEGRADATION

Maharashtra has implemented several programmes and projects to address forest degradation, aiming to restore ecological balance and ensure sustainable forest management. One of the key initiatives is the Green India Mission, which focuses on increasing forest and tree cover, restoring degraded forest landscapes, and enhancing biodiversity with active community participation. The Forest Fire Management Programme is also critical, using satellite-based alerts, fire line creation, and awareness campaigns to prevent and control forest fires, which are a major cause of degradation. Joint Forest Management has been widely adopted in the state to involve local communities in forest protection and

sustainable use facilitated through Joint Forest Management Committees that share forest benefits with villagers. Additionally, the state implements Compensatory Afforestation under CAMPA, where forests lost to development are replaced through afforestation projects, often coupled with soil and moisture conservation measures. Some of the other government initiatives and efforts to combat forest degradation and promote forest restoration in Maharashtra are as follows:

a) Maharashtra Forest Department Initiatives: The department focuses on large-scale plantations in degraded forest lands, encouraging partnerships with businesses and industrial houses.

b) Mission Plantation: This state-wide campaign was launched in 2019 to plant 500 million saplings in Maharashtra.

c) Vanmahotsav: An annual tree plantation festival held in July, involving the Forest Department, schools, colleges, NGOs and the public.

d) Green Army: A volunteer group formed by the Forest Department to assist with tree plantation and environmental conservation.

e) Environmental Balanced Village Scheme: Promotes sustainable development in villages through tree plantation and other eco-friendly practices, providing financial assistance for environmental conservation measures.

f) Mangrove Conservation: The Mangrove Cell and the Mangrove and Marine Biodiversity Conservation Foundation were established to protect and expand coastal ecosystems, including patrolling mangrove areas, demolishing illegal structures, and promoting mangrove plantation. They also engage with local communities and support sustainable livelihoods.

10 DEMOGRAPHIC PROFILE OF MAHARASHTRA

Maharashtra is the third largest State in India accounting for 9.4% (3,07,731 sq km) of the total geographical area of the country. Based on socio-political and other geographical considerations, the State is divided into five main regions: Vidarbha (north-eastern region), Marathwada (south-central region), Khandesh (north-western region), Northern Maharashtra and Western Maharashtra (Konkan). Maharashtra occupies the western and central part of the country and has a long coastline stretching nearly 720 km along the Arabian Sea. The Western Ghats is not only the prominent biodiversity resource for the region and an important climatic divide (average elevation of 1200 metres), but also forms one of the three watersheds of the State from which originate several important rivers, including Godavari and Krishna.

As per the Population Census 2011, the population of the State was 11.24 crore, which was 9.3% of the All-India population. The State was the second largest populous state in India after Uttar Pradesh, and the sex ratio and child sex ratio for the State were 929 and 894, respectively. The State had a population density of 365 as against 382 for All-India. As per Census 2011, slum population in the State was 1.18 crore. The urban population is 50.82 million (45.22%), rural 61.55 million (54.78%), while the tribal population is 10.51 million. As per Census 2011, the literacy rates of males and females for the State were 88.4% and 75.9% respectively. Gender gap in literacy rate in the State has reduced from 19.0 percentage points as per Census 2001 to 12.5 percentage points. Maharashtra is divided into 35 districts, which act as the administrative divisions. Thane is the largest district of Maharashtra by population, while the least populated district of Maharashtra is Sindhudurg.

The major geographic features of Maharashtra are Sahyadri Range, Western Ghats, Deccan Plateau, Konkan coastal belt and the river valleys. The main rivers of the state include Krishna, Bhima, Godavari, Tapi-Purna and Wardha-Wainganga. The climate is of a tropical monsoon type with a searing heat in the summer months, and cold winter. The monsoons have varied influence over different regions, causing heavy rain at some places and mild rainfall in others. The primary census data are shown in Table 6.

Table 6: Demographic details of Maharashtra State

S. No.	Indicators	Persons	Males	Females
1	Population	11,23,74,333	5,82,43,056	5,41,31,277
2	Child Population	1,33,26,517	70,35,391	62,91,1 26
3	Scheduled Castes	1,32,75,898	67,67,759	65,08,139
4	Scheduled Tribes	1,05,10,213	53,15,025	51,95,188
5	Literate	8,15,54,290	4,52,57,584	3,62,96,706
6	Illiterate	3,08,20,043	1,29,85,472	1,78,34,571
7	Workers	4,94,27,878	3,26,16,875	1,68,11,003
8	N on -Workers	6,29,46,455	2,56,26,181	3,73,20,274

11 OVERVIEW OF THE STAKEHOLDERS FOR FOREST LANDSCAPE RESTORATION

Forest landscape restoration in Maharashtra involves a diverse range of stakeholders working together to restore degraded forests and enhance ecosystem services. At the core are government agencies such as the Maharashtra Forest Department, which leads afforestation and conservation efforts, and the Department of Rural Development, which supports restoration through schemes like MGNREGA. The Revenue Department plays a critical role in land identification, while the Maharashtra State Biodiversity Board helps conserve local biodiversity. Local communities, including tribal groups such as the Bhil, Gond and Warli are essential partners, particularly through Joint Forest Management Committees and Gram Panchayats, empowered by laws like the Forest Rights Act to manage and restore community forest resources. Some NGOs actively involved in implementation of restoration initiatives, promotion of agroforestry and capacity building at local level. The private sector, through CSR programs and sustainable business models, also supports FLR by funding tree plantations and livelihood-linked restoration.

11.1 THE STATE FOREST DEPARTMENT

To successfully achieve the mandate and for proper administration and management, the state has 11 Territorial Forest Circles and 4 Wildlife Territorial Circles, 48 Territorial Divisions and 14 Wildlife Territorial Divisions, 5 Independent Territorial Subdivisions, 393 Territorial Forest Ranges, 1540 Rounds and 5688 Beats including Wildlife Territorial Ranges, Rounds and Beats. Forest Department has set aside the following mandate:

- To protect and conserve forest resources in Maharashtra through sustainable forest management.
- To provide critical mass data to maintain and enhance biodiversity for ecosystem health and vitality.
- To conserve soil and water resources for ecological and environmental stability by effective monitoring.
- To enhance forest productivity using modern scientific tools.
- To meet the requirements of forest products like timber, fuel wood, fodder etc. of the people of the state particularly those dependent on forest.
- To cater to the needs of socio-economic development of villages in and around forest areas.
- To provide baseline data to evolve strategic policy, legal and institutional framework to address emerging needs.

11.2 OTHER LINE DEPARTMENTS

Department of Agriculture: The Department of Agriculture was established in July 1883 as recommended by the Women's Commission of 1881. The work was started with the aim of providing necessary support from the government level for increasing production in agriculture in rural areas by including all departments related to agriculture sector. Until 1907, the accounts of Agriculture and Land Records were working together. In the year 1915-16, Mr. Keating, the then

Director of Agriculture, started soil conservation works from 1922 after the promising results of an experiment to stop soil erosion. From the year 1965-66, the foundation of the Green Revolution was laid in the country due to the creation of hybrid varieties of various crops. In the subsequent five-year plans, special emphasis was placed on agricultural development. Since the year 1974, along with land reclamation work, drain construction works started through the department, which helped to increase the water level in wells and underground. For increasing agricultural production, the use of seeds, fertilizers, pesticides and available water was started on a large scale through intensive farming methods, thus helping to increase agricultural production, then keeping in mind the urgency of more guidance to the farmers to use these things in a scientific manner, training and visiting scheme from the year 1981-82 started. The effective implementation of programs such as crop demonstrations, field visits, promotional meetings, seminars, meetings, exhibitions, etc., designed to convey the improved technology of the agricultural university to the common farmers, has added value to the increase in agricultural production.

Department of Animal Husbandry: Animal husbandry is an all-year-round livelihood source for the livestock owners. But nowadays it has emerged as a full-fledged industry. It helps in upliftment of rural socio-economic status & problems of unemployment. Animal husbandry sector has maximum employment generation potential. Different aspects of animal husbandry have helped the animal owners and all the businesses related to animal husbandry flourish tremendously. It has also contributed to raise the social and economic status of people in the rural areas through economic development. Therefore, animal husbandry plays a major public utility role and adds is the national income through the rearing of livestock and production of related products and by-products viz. milk, ghee, meat, egg etc. Through the export of some of the products, the country gets valuable foreign exchange. In view of providing modern facilities for the development and growth of livestock, the Department of Animal Husbandry has been established mainly with the aim to provide facilities for Artificial Insemination and animal health.

Rural Development and Panchayat Raj Department of Maharashtra: The Rural Development Department was established on 1 May 1960. Rural Development Department of Maharashtra is working for overall development of rural areas. Nationalist villages should be autonomous, all facilities should be available and different types of facilities should be available, clean, beautiful and green villages to carry out various activities, Maharashtra State Rural Life Mission to carry out poverty alleviation activities, providing independent shelter and shelter facilities for Indra residents, providing training, The main objective of this department is to carry out development programs, empower people, strengthen Panchayati governance.

Directorate of Sericulture: Sericulture is an industry that helps to raise the economic level of the people in the rural areas, has a huge potential for employment generation, provides more benefits to the agricultural allied activities and farmers in a short period of time and also provides foreign exchange. The geographical situation and climate of Maharashtra are conducive to the sericulture industry, and this industry can definitely help the farmers to compensate for the economic losses in agriculture due to the vagaries of the current climate. The silk industry in the state of Maharashtra includes production of cocoons by cultivation of silkworms on mulberry and Ain/Arjuna trees and production of cocoons, producing of yarn, production of cloth and processing of cloth etc. Since the environment in the state is seen to be conducive to the silk industry and there is a large scope for the development of the silk industry in the state, the government has undertaken a program for the overall development of the silk industry. For this, Directorate of Sericulture has been established under the administrative control of Textiles Department since September 1997 and the responsibility of silk industry development lies with Directorate of Sericulture.

11.3   ROLE OF LOCAL COMMUNITIES IN FOREST LANDSCAPE RESTORATION

Local communities play a crucial role in forest landscape restoration in the state of Maharashtra. Their involvement is vital not only for ecological restoration (FLR) but also for ensuring the long-term sustainability and socio-economic benefits of restored landscapes. Many communities, especially tribal groups such as the Gond, Bhil, Warli and Katkari possess rich traditional knowledge about local ecosystems, native plant species and sustainable land-use practices. This knowledge greatly contributes to the planning and implementation of restoration activities. Through initiatives like Joint Forest Management communities actively participate in the protection, regeneration and sustainable use of forests. In districts such

as Gadchiroli and Chandrapur, local communities have successfully restored degraded forests by integrating livelihood options like bamboo harvesting, non-wood forest products collection, and agroforestry. Their participation in monitoring, protecting plantations and preventing forest fires also enhances the effectiveness of restoration efforts. Moreover, involving communities fosters local stewardship and helps resolve conflicts related to land and resource use. To strengthen the role of communities in FLR, there is a need for greater institutional support, financial incentives, training and inclusive decision-making processes. Overall, the success of FLR in Maharashtra depends significantly on the meaningful engagement and empowerment of its local communities.

12 BACKGROUND OF RECAP4NDC PROJECT

'Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) Project' contributes to the Joint Declaration of Intent on FLR between the Indian and the German Governments. RECAP4NDC, an Indo-German project is funded by the International Climate Initiative of the German Federal Government, with direct commissioning by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection.

To reduce the pressure on existing forests, to meet the increasing demand of forest produces and to achieve national targets and international commitments, some transformative actions need to be taken for restoration of degraded forest landscape. Forest and tree cover can be increased significantly by taking up plantation and afforestation outside the forests, and restoration of degraded forests and scrub forests. Agroforestry, farm forestry and urban forestry can help in increasing tree cover of the country.

Implementation challenges, access of funds, monitoring, reporting and verification, and knowledge sharing are some of the gaps that exist in restoration of degraded forest landscape and which can be addressed by building the capacities, sharing of knowledge and leveraging stakeholder interest which translates policy goals into action.

The project is being implemented in the selected landscapes in the states of Delhi and National Capital Region, Uttarakhand, Maharashtra and Gujarat. RECAP4NDC project empowering the stakeholders to effectively plan, finance, implement, and monitor initiatives related to forest landscape restoration in project area.

Consortium Partners: The project is being implemented by six consortium partners comprising of GIZ (as the consortium lead), International Union for the Conservation of Nature (IUCN), Forest Survey of India (FSI), The Energy and Resources Institute (TERI), Indian Council for Forestry Research and Education (ICFRE) and International Centre for Integrated Mountain Development (ICIMOD).

Project Goal: To contribute to India's forestry NDC target, National Forest Policy 1988 target, Bonn Challenge target, and the National Action Plan for Climate Change by improving degraded forest landscapes, livelihoods and ecosystem services.

Project Outcome: Stakeholders at national, regional, and local levels benefit from forest landscape restoration through improved ecological integrity, enhanced socio-economic opportunities, strengthened governance systems, and increased resilience to climate change. Project outcome will be achieved through the following five outputs:

I.   **FLR Model Implementation:** This output aim to provide technical assistance to implement different FLR approaches in selected model sites. Model sites implemented over 150,000 ha generating ecological, socio-economic, governance and climate change-related benefits in over 400,000 ha.

II. **Monitoring, Evaluation and Reporting:** Integrated systems for monitoring, evaluation and reporting of ecological and socio-economic benefits of FLR aims at establishing and using integrated systems for monitoring, evaluation and reporting of climate, ecological and socio-economic benefits.

III. **Financing FLR:** Models and tools for financing FLR from private, public, and international sources for piloting and upscaling.

IV. **Policies and guidelines for FLR** are anchored in existing policy and planning processes: It aims to anchor FLR in existing policy and planning processes.

V. **Capacities, Knowledge and Communication**: It aims to transfer knowledge and capacitate national and international stakeholder groups. Capacity development includes trainings, induction courses/curricula development on FLR for public staff across different sectors and levels. ICFRE is mainly responsible for execution of the activities pertaining to Output V of the project along with ICIMOD and GIZ.

Objectives of Output V:

- To build the capacities of the local, national, and international stakeholders on **FLR** through conducting trainings, induction courses, curricula development on gender responsive **FLR** for public staff across different sectors and levels.

- **To develop** suitable mechanism for sharing of knowledge on FLR and its topics.

- To develop suitable mechanism for communicating the messages on FLR and its topics.

- Efforts are being made to work extensively with premier forestry institutions such as Indira Gandhi National Forest Academy, Central Academy for State Forest Services, Centre of Excellence on Sustainable Land Management, Forest Research Institute (Deemed to be University) etc. on FLR and its topics.

Capacity building of the state of Delhi and National Capital Region, Uttarakhand, Maharashtra and Gujarat actors are being undertaken based on training need assessment. Capacity building and knowledge sharing provide an excellent opportunity to all the stakeholders for enhancing their knowledge base and upgrading their skills on various aspects of FLR for climate change mitigation and adaptation. Development of capacities, knowledge sharing and communication mechanisms is one of the key outputs for successful implementation of the RECAP4NDC project. This output includes community empowerment and concrete community action for on-ground activities pursued in cooperation with Gram Panchayats, Van Panchayats, Forest Development Committees, Biodiversity Management Committee, Resident Welfare Associations and CSOs/ NGOs.

13 LANDSCAPES SELECTED FOR IMPLEMENTATION OF INTERVENTIONS OF RECAP4NDC PROJECT

Four model sites have been selected in the state of Maharashtra for implementation of activities related to forest landscape restoration under the RECAP4NDC Project. Each site has been strategically selected to address region-specific environmental challenges while aligning with broader forest landscape restoration objectives (Fig. 5 and Table 7).

- Model Site-1 Pune District

- Model Site-2 Ahilyanagar District

- Model Site-3 Chandrapur District

- Model Site-4 Jalgaon District

Model Site - 1 Pune District: The district has a place of 15,643 sq km and a population of 94,29,408 people as per 2011 Census. While the area of the district accounts for 5.08 percentage of the full place of the State, the district population constitutes 8.39 percentage of the whole population of the State. The density of population is 603 persons per sq. Km. Among the 35 Districts of the State, Pune District ranks 2nd in term of area and population, and 4th in term of density.

Model Site - 2 Ahilyanagar District : Ahilya Nagar district at present has 14 tehsils, comprising 1587 villages and 18 towns. Spanning an area of 17,048 sq. Km, Ahilyanagar accounts for 5.5% of Maharashtra's geographical area, making it one of the

biggest districts in the state. In 2011, district had a population of 4,543,159, with a sex ratio of 934 females per thousand males and district's population density 266 in per sq km.

Model Site - 3 Chandrapur District: Chandrapur District is the eastern part of the greater tract known as the "Vidarbha", that is well-known for various styles of minerals like iron, coal etc. The district has an area of 11,443 sq. kms and a population of 20,04,307 persons (Census 2011). While the area of the district 3.72 percent of the entire of the State, the district population constitutes 1.96 percent of the overall population of the State. The density of population is 193 persons per sq km.

Model Site - 4 Jalgaon District: Jalgaon district, placed in northern Maharashtra, also demonstrates community involvement in forest panorama healing, especially in shielding wildlife sanctuaries and through afforestation campaigns. According to the 2011 Census, the entire population of the district is 42,29,917. The headquarters of Jalgaon district is at Jalgaon town, having a population of 4,60,228, and is positioned nearly in the centre of the district. Jalgaon district has an area of 11,765 sqm. The population density is 360 per sq.km. Jalgaon district has 15 towns and 1,519 villages are spread over 15 tehsils.
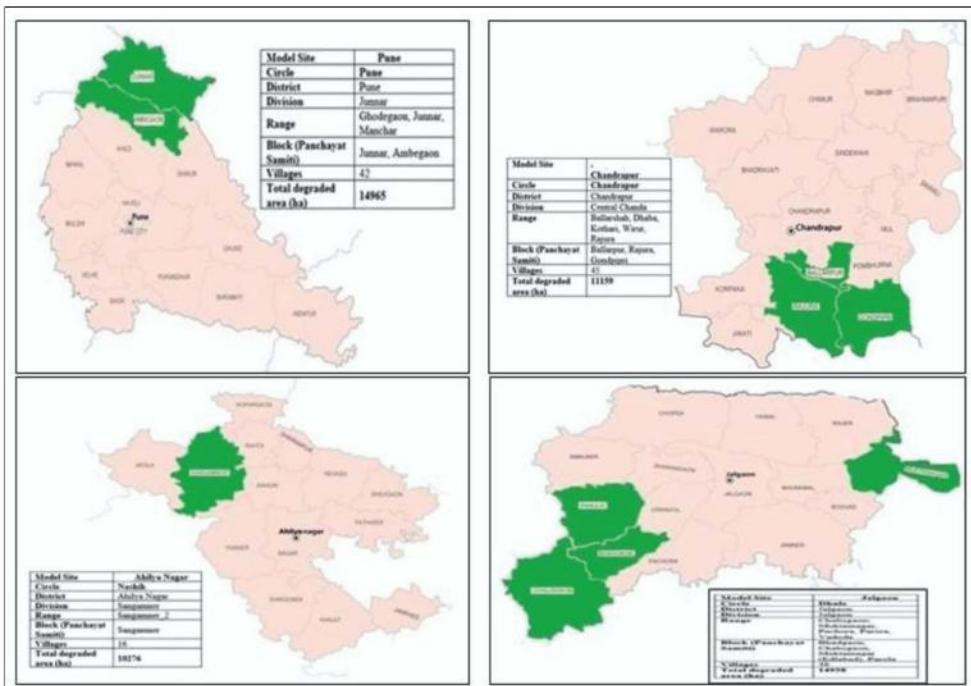
Fig. 5: Selected Landscapes in Maharashtra for Forest Landscape Restoration

Table 7: Details of Model Sites in Maharashtra State for intervention

Model Site	Pune	Ahilya Nagar	Chandrapur	Jalgaon
Circle	Pune	Nashik	Chandrapur	Dhule
District	Pune	Ahilya Nag ar	Chandrapur	Jalgaon
Forest Division	Junnar	Sangamner	Central Chanda	Jalgaon
Forest Range	Ghodegaon, Junnar, Manchar	Sangamner -II	Ballarshah, Dhaba, Kothari, Wirur, Rajura	Chalisgaon, Muktainagar, Pachora, Parora, Vadoda
Block	Junnar, Ambegaon	Sangamner	Ballarpur, Rajura, Gondpipri	Bhadgaon, Chalisgaon, Muktainagar (Edlabad), Parola
Villages	42	16	45	48
Total degraded area (ha)	14965	10276	11159	14958

14   TRAINING NEEDS ASSESSMENT AND ITS OBJECTIVES

Forest Landscape Restoration (FLR) is a holistic, long-term strategy focused on restoring ecological functionality and improving human well-being across degraded and deforested landscapes. To support the Maharashtra State Forest Department and other stakeholders in effectively implementing FLR initiatives, it is essential to conduct a comprehensive training need assessment (TNA). The TNA identifies knowledge and capacity gaps among officers and staff at various levels, and local community members involved in planning, implementing and monitoring FLR interventions. TNA informs the development of targeted training programs tailored to address capacity gaps, local challenges, and align with national priorities and international commitments related to forest, climate change, biodiversity conservation, land restoration and the Sustainable Development Goals.

Given that FLR requires cross-sectoral coordination spanning agriculture, watershed management, rural development, irrigation, and soil and water conservation, the State Forest Department staff must be skilled in policy integration and collaborative planning. A well-executed TNA supports the creation of focused, need-driven training modules that build the capacities of all stakeholders, ultimately fostering more resilient and sustainable forest landscapes.

The implementation of FLR interventions requires effective cross-sectoral coordination among key departments and stakeholders to ensure policy integration and collaborative planning. Conducting a thorough TNA facilitates the creation of targeted, need-based training modules that strengthen the capacities of all involved stakeholders, thereby fostering more resilient and sustainable forest landscapes. The primary objective of TNA is to pinpoint specific knowledge and capacity gaps related to FLR among all relevant stakeholders. These insights will guide the design of targeted training modules to strengthen the capacities of the relevant stakeholders for the successful implementation of FLR programs and projects, contributing to national targets and international commitments related to forests and environment. Based on the findings of the TNA, customized training modules on FLR and related topics to be developed under the RECAP4NDC Project. These modules are designed to enhance the capacity of the Maharashtra State Forest Department, Other Line departments and local communities.

15   METHODOLOGY OF TRAINING NEEDS ASSESSMENT

15.1.   TRAINING NEEDS ASSESSMENT FOR STATE FOREST DEPARTMENT AND OTHER LINE DEPARTMENTS:

Primary data for the study was collected through field surveys employing a structured questionnaire. The questionnaire included a limited number of close-ended questions and was administered to a targeted group of respondents comprising officers and staff of the State Forest Department and Other Line Departments of Maharashtra. To ensure representative coverage and to effectively assess training and capacity-building needs, one territorial Forest Division was selected at random from each Forest Circle selected for RECAP4NDC Project within the state of Maharashtra. This approach allowed for the collection of diverse inputs across different Forest Divisions of the state. The Forest Divisions selected randomly for conducting training need assessment surveys are listed in the Table 8.

Table 8: Forest Divisions selected for training need assessment surveys

S. No.	Forest Circle	Number of Forest Divisions for FLR under the Project	Selected Forest Division for TNA
1	Nagpur	Hqs. of SFD	Nagpur
2	Pune	01	Junnar
3	Nashik	03	East Nashik
4	Dhule	03	Jalgaon
5	Auran gabad	01	Aurangabad
6	Chandrapur	03	Central Chanda
7	Yavatmal	02	Yavatmal
8	Gadchiroli	02	Allallpalli

A structured and systematic approach was undertaken to conduct the Training Needs Assessment in the State of Maharashtra. As a key preparatory step, separate and customized questionnaires were developed for three major stakeholder groups: Officers (Range Forest Officer and above) of the State Forest Department, Frontline Staff (Forest Guard to Foresters) of the State Forest Department, and Officers and Staff of Other Line Departments. These tailored questionnaires were designed to ensure contextual relevance for each group and to facilitate meaningful comparisons of training needs across categories. To ensure representativeness, respondents from each stakeholder group were selected through a random sampling process. This method was employed to minimize selection bias and to ensure that the survey findings reflected a diverse and balanced range of perspectives across departments and functional levels.

The questionnaire designed for Officers of the State Forest Department aimed to collect comprehensive information on their understanding of FLR topics. It sought details on the types of FLR-related trainings they had previously attended, as well as the current schemes or projects being implemented in the State. Additionally, the questionnaire explored the restoration practices currently in use for degraded forest landscapes, the most effective knowledge products for knowledge sharing on FLR information, and their preferences pertaining to modes of training, timing and duration of capacity-building initiatives (Annexure 1). The questionnaire for the frontline staff of the State Forest Department was designed to gather information on their familiarity with Forest Landscape Restoration (FLR) topics, participation in relevant trainings, current restoration practices, and the knowledge products they found most effective for learning and knowledge sharing. It also explored their preferred training methods, as well as suitable timings and durations for such sessions (Annexure 2). The questionnaire for officers and staff of Other Line Departments was designed to assess their awareness and understanding of FLR, assess their department's involvement in FLR-related activities, and document the restoration practices currently being followed. It also explored their preferred training methods, as well as suitable timings and durations for such sessions (Annexure 3).

Primary data from the selected Forest Divisions and Districts of the state were collected during September and October 2024. Data on training needs assessment were also collected from officers at the headquarters of the Maharashtra State Forest Department. To validate and enrich the survey findings, follow-up discussions were conducted with selected respondents. These consultations served to clarify responses, elicit deeper insights, and facilitate qualitative interpretation. This comprehensive approach enhanced the overall analysis, ensuring that the identified training needs accurately reflected on-the-ground realities. The details of respondents of TNA surveys are given in Table 9.

Table 9: Details of respondents of State Forest Departments and Other Line Departments

Name of Division	Number of Respondents							
	State Forest Department					Other Line Departments		
	Officers	Frontline Staff	Male	Female	Total	Male	Female	Total
Junnar	03	22	17	08	25	03	-	03
Nagpur	06	28	24	10	34	04	06	10
East Nashik	02	26	22	06	28	03	-	03
Central Chanda	10	21	23	08	31	02	-	02
Aurangabad	08	34	34	08	42	02	-	02
Jalgaon	05	26	23	08	31	01	-	01
Allapalli	07	34	36	05	41	02	-	02
Yavatmal	04	44	35	13	48	03	-	03
Total	**45**	**235**	**214**	**66**	**280**	**20**	**06**	**26**

15.2. TRAINING NEEDS ASSESSMENT FOR LOCAL COMMUNITIES

Local communities in Maharashtra constitute a critical stakeholder group in the implementation and long-term success of forest landscape restoration initiatives. Given their continuous interaction with the landscape, community members possess context-specific knowledge of environmental conditions, livelihood challenges, and resource management practices. Engaging these communities is therefore essential for the co-development of effective, locally grounded

capacity-building strategies. To systematically capture community perspectives, a mixed-methods approach was employed, incorporating Focus Group Discussions and structured questionnaire-based surveys across selected FLR landscapes in Maharashtra. These participatory tools facilitated the collection of both qualitative and quantitative data, enabling community members to articulate their lived experiences, express their training needs, and outline their aspirations related to skill enhancement. The survey instrument (Annexure 4) was designed to evaluate both existing knowledge and practical competencies, while also identifying areas where targeted training is required. The assessment focused on key thematic areas including sustainable farming practices, animal husbandry, soil and water conservation, and environmental awareness. Respondents were asked to rate their self-perceived proficiency in each area and to specify any recurrent challenges they face in applying these skills within their local context.

To determine an appropriate sample size for field-based assessments and stakeholder consultations, Cochran's sample size formula (Cochran, 1963; 1977) was applied. Using a 90% confidence level and a 15% margin of error, the minimum required sample size was calculated to be 24 villages. This sample size ensures statistically reliable representation of the total village population across four landscapes within the specified confidence parameters. Number of villages selected for TNA surveys in the selected landscapes are given in Table 10 and Table 11.

Table 10: Details of villages selected for TNA

S. No.	District	Total villages (model sites)	Tehsil	No of Villages in Tehsil	Sampled villages
1.	Pune	42	Ambegaon	21	3
			Junnar	21	3
2.	Ahilya Nagar	16	Sangamner	16	3
3.	Chandrapur	45	Ballarpur	31	4
			Gondpipri	2	1
			Rajura	12	2
4.	Jalgaon	48	Bhadgaon	11	2
			Chalisgaon	5	1
			Muktainagar	21	3
			Parola	11	2
Total		**151**			**24**

Table 11: Details of villages selected for TNA

S. No.	Name of Village	Population	No of Household	Tehsil	District
1.	Botarde	1436	290	Junnar	Pune
2.	Sarwangaon	3185	776	Junnar	Pune
3.	Warluwadi	12401	2799	Junnar	Pune
4.	Lauki	924	202	Abmegaon	Pune
5.	Thorandole	1813	382	Abmegaon	Pune
6.	Mahalunge Padwal	3483	778	Abmegaon	Pune
7.	Konchi	1283	260	Sangamner	AhilyaNagar
8.	Kuran	4417	670	Sangamner	AhilyaNagar
9.	Sukewadi	5992	1183	Sangamner	AhilyaNagar
10.	Murti	986	256	Rajura	Chandrapur
11.	Kapangaon	227	54	Rajura	Chandrapur
12.	Kawadjai	1694	419	Ballarpur	Chandrapur
13.	Kudesawali	890	237	Gondpipri	Chandrapur
14.	Katwali	635	165	Ballarpur	Chandrapur
15.	KemTukum	321	63	Ballarpur	Chandrapur

16.	Etoli chak no 1	1034	288	Ballarpur	Chandrapur
17.	Charthana Madhapuri	952	159	Muktainagar	Jalgaon
18.	Mahalkhede	1343	334	Muktainagar	Jalgaon
19.	Dolerkheda	904	215	Muktainagar	Jalgaon
20.	Ratale	1102	213	Parola	Jalgaon
21.	Kunzar	3920	811	Chalisgaon	Jalgaon
22.	Shivare Digar	2474	540	Parola	Jalgaon
23.	Pathrod	1341	282	Bhadgaon	Jalgaon
24.	Adalase	710	161	Bhadgaon	Jalgaon
	Total	**53467**	**11537**		

Field surveys of the selected villages under the four Landscapes were conducted in the month of January 2025 for collection of the data on training need assessment. The details of the respondents surveyed for TNA are given in the Table 12.
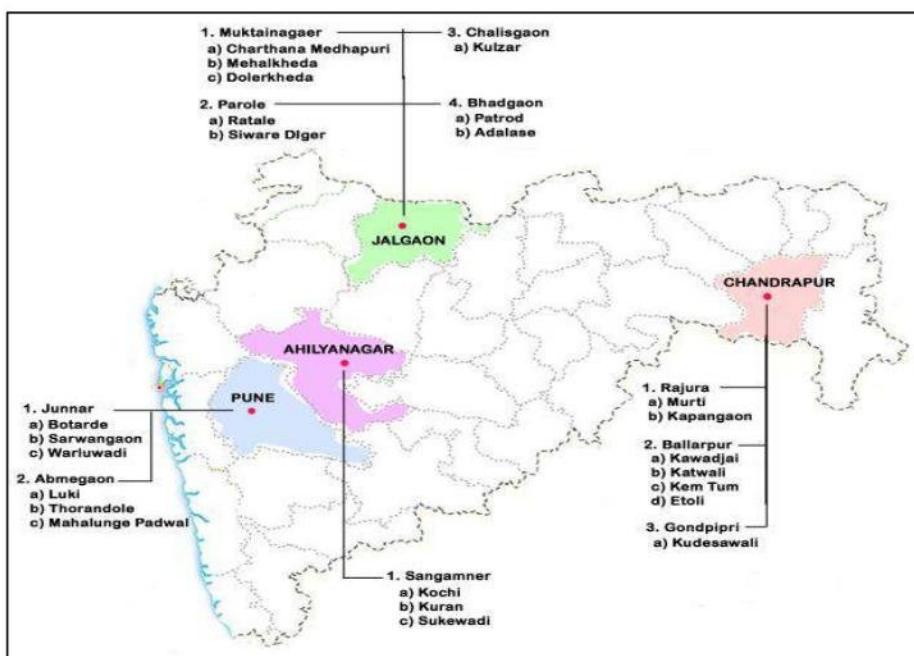
Fig. 6: Villages selected for conducting TNA surveys for the local communities of Maharashtra

Table 12: Number of participants in FGD during TNA conducted in Maharashtra

S. No	Project sites	No. of villages	Total participants	Average size of FGD	% of male participants	% of female participants
1	Pune	6	136	22	82	18
2	AhilyaNagar	3	132	44	97	03
3	Chandrapur	7	247	35	69	31
4	Jalgaon	8	310	39	76	24
	Total	**24**	**825**	**34**	**81**	**19**

16 FINDINGS OF THE TRAINING NEED ASSESSMENT

16.1 FAMILIARITY WITH FOREST LANDSCAPE RESTORATION AND RELATED CONCEPTS: STATE FOREST DEPARTMENT AND OTHER LINE DEPARTMENTS

16.1.1   Officers of State Forest Department

The data analysis revealed significant knowledge gaps among respondents regarding key topics related to forest landscape restoration (Table 13). Nearly 78% of the respondents were not familiar with spring shed management and domestic and international funding for FLR and 69% of the respondents showed not familiar with forest certification. Almost 67% to 56% of respondents were not familiar about carbon market mechanism, NWFP value chain and Green Credit Programme. About 44% to 36% of the respondents were found to be not familiar about forest carbon stocks measurement, ecosystem services and its valuation, nature-based solutions/ ecosystem based approaches, REDD+, and climate change mitigation and adaptation in forest sector (Table 13).

Table: 13: Percentage of respondents not familiar with topics related to FLR

S. No.	Topics related to FLR	Not Familiar (Responses in %)
1	Springshed management	78
2	Domestic and International funding for FLR	78
3	Forest certification	69
4	Carbon market mechanism	67
5	NWFP value chain	60
6	Green Credit Programme	56
7	Forest carbon stocks measurement	44
8	Ecosystem services and its valuation	44
9	Nature-based solutions/ecosystem based approaches	42
10	REDD+ and Forest carbon projects	40
11	Climate change mitigation and adaptation in forest sector	36
12	International Agreement/ Conventions related to forest and environment and India's commitment	31
13	Gender mainstreaming in forest management	31
14	LiFE: Life Style for Environment	29
15	Climate change impact and vulnerability in forest sector	22
16	Invasive species and their management	20
17	Legal framework (Policies, laws and regulations) for conservation and protection of forest and environment	18
18	Forest landscape restoration	16
19	Sustainable Development Goals	13
20	Sustainable harvesting of NWFP and their role in livelihood generation	11
21	Restoration of degraded forests/ landscapes	9
22	Eco-tourism	7
23	Sustainable forest management	4
24	Nursery and plantation techniques of forestry species	2
25	Soil and water conservation measures	0
26	Forest fire and its management	0
27	Community forest management (JFMCs/ BMCs etc.)	0

As evident from Table 13, the topics related to forest landscape restoration as listed below have been identified and prioritized based on the responses of 40% or more of the respondents, for the purpose of capacity building of the officers of State Forest Department:

❖ Springshed management
❖ Domestic and international funding for FLR
❖ Forest certification
❖ Carbon market mechanism
❖ NWFP value chain
❖ Green Credit Programme
❖ Forest carbon stocks measurement
❖ Ecosystem services and its valuation
❖ Nature-based solutions/ ecosystem-based approaches
❖ REDD+

16.1.2. Frontline Staff of State Forest Department

The Training Needs Assessment data from 235 frontline staff reveals significant knowledge gaps in key thematic areas. An overwhelming 78% of respondents indicated unfamiliarity with India's Nationally Determined Contribution targets under the Paris Agreement and the concept of spring-shed management. Additionally, between 56% and 71% of respondents reported limited knowledge of forest carbon stock measurement and nature-based solutions or approaches. Furthermore, 26% to 46% of respondents were not familiar with the topics such as gender mainstreaming in forest management, invasive species and their management, forest landscape restoration approaches, sustainable harvesting of non-wood forest products and their role in livelihood generation, sustainable forest management, and relevant policies, laws, and regulations related to forest biodiversity conservation in India. The detailed results are presented in Table 14.

Table 14: Percentage of respondents not familiar with topics related to FLR

S. No.	Topics related to FLR	Not Familiar (Response %)
1	India's Nationally Determined Contribution targets under the Paris Agreement	78
2	Springshed management	78
3	Forest carbon stocks measurement	71
4	Nature-based solutions/approaches	56
5	Gender mainstreaming in forest management	46
6	Invasive species and their management	38
7	Forest landscape restoration concepts/approaches	31
8	Sustainable harvesting of NWFP and their role in livelihood generation	31
9	Sustainable forest management	27
10	Policies, laws and regulations for conservation of forest biodiversity in India	26
11	Legal framework for conservation and protection of forest and environment in India	23
12	Eco-tourism	20
13	Community forest management (JFMC/BMC/SHG)	18
14	Restoration of degraded forests	18
15	Biodiversity conservation	12
16	Nursery and plantation techniques of forestry species	10
17	Soil and water conservation measures	6
18	Forest fire and its management	3

As evident from Table 14, the topics related to forest landscape restoration as listed below have been identified and prioritized based on the responses of 40% or more of the respondents for the purpose of capacity building of the Frontline Staff of State Forest Department:

❖ India's Nationally Determined Contribution targets under the Paris Agreement
❖ Spring shed management
❖ Forest carbon stocks measurement
❖ Nature-based solutions/approaches
❖ Gender mainstreaming in forest management

16.1.3. Officers and Staff of Other Line Departments

About 26 Officers and Staff from Agriculture cum Horticulture and Watershed Management Department located at different Districts of Maharashtra participated in the TNA Survey. The analysis of the collected data clearly highlights several key areas for capacity building. These include: spring-shed management, management of invasive species, the legal framework for environmental conservation and protection in India, international environmental agreements and conventions, gender mainstreaming in natural resource management, climate change mitigation and adaptation, participatory natural resource management, and the "LiFE – Lifestyle for Environment" initiative. The detailed results of the analysis are presented in Table 15.

Table 15: Percentage of respondents not familiar with topics related to FLR

S. No.	Topics related to FLR	Not Familiar (Responses in %)
1	Springshed management	81
2	Invasive species and their management	69
3	Legal framework for conservation and protection of environment in India	62
4	International Agreement/ Conventions related to environment	58
5	Gender mainstreaming in natural resource management	50
6	Climate change mitigation and adaptation	38
7	Participatory natural resource management	38
8	LiFE Style forenvironment	38
9	Disaster management / Disaster risk reducation	31
10	Sustainable livelihood generation	27
11	Restoration of degraded areas	23
12	Nature-based solution/ ecosystem based approaches	23
13	Sustainable development goals	19
14	Eco-tourism	19
15	Climate change impacts and vulnerability	15
16	Agroforestry/ farm forestry/ urban forestry	15
17	Natural resource management	04
18	Sustainable land management	04
19	Soil and water conservation	00

As evident from table 15, the concepts related to FLR as listed below have been identified and prioritized based on the responses of 40% or more of the respondents, for the purpose of capacity building of the officers and staff of Other Line Department:

❖ Springshed management

❖ Invasive species and their management

❖ Legal framework for conservation and protection of environment in India

❖ International Agreement/ Conventions related to environment

❖ Gender mainstreaming in natural resource management

16.1.4. Practices being followed by the State Forest Department for Restoration of Degraded Forest Landscape

An analysis of data on the restoration practices employed by the State Forest Department reveals a strong emphasis on several key interventions. These include assisted natural regeneration practices/ enrichment plantations, fencing, check dam construction, forest fire management, rain water harvesting, construction of trench cum mound, invasive species management and meadow/ grassland development. Similarly, Frontline Staff have also highlighted assisted natural regeneration practices/ enrichment plantations, fencing, forest fire management, check dams, construction of trench cum mound and rain water harvesting being the sustainable land management practices for restoration of degraded landscapes. The practices being followed by the State Forest Department for restoration of degraded forest landscape are listed below:

❖ Assisted natural regeneration practices/ enrichment plantations

❖ Fencing

❖ Check dam construction

❖ Forest fire management

❖ Rain water harvesting

❖ Construction of trench cum mound

❖ Invasive species management

However, the analysis of data of Other Line Departments displays that the following sustainable land management practices are being followed for restoration of degraded landscapes.

❖ Improved variety of seed distribution

❖ Organic farming

❖ Rain water harvesting

❖ Quality planting materials

❖ Micro-irrigation

❖ Agroforestry

16.1.5. Type of Knowledge Products

The analysis of the data collected on the types of knowledge products preferred for effective knowledge sharing on the restoration of degraded forest landscapes clearly indicates a strong preference for videos across all respondent groups. Among State Forest Department (SFD) Officers, 96% indicated that videos are the most effective knowledge product. Additionally, 56% to 67% of them identified e-books/e-manuals, manuals, brochures and posters as effective tools. In contrast, books, infographics, flyers, and pamphlets were less preferred. Similarly, 84% of Frontline Staff from the SFD also preferred videos, while 47% to 79% considered books, manuals, posters, and e-books/e-booklets/e-manuals to be effective for knowledge dissemination. Notably, 100% of respondents from Other Line Departments selected videos as an effective medium. Furthermore, 54% to 73% of them found brochures, pamphlets, e-books/e-booklets/e-manuals, manuals and books to be useful knowledge products for sharing information on the restoration of degraded landscapes. The detailed results of this analysis are presented in Table 16.

Table 16: Preference of knowledge products for knowledge sharing on FLR

S. No.	Type of Knowledge Product	Preference (%)		
		Officers SFD	Frontline Staff SFD	Other Line Departments
1	Videos	96	84	100
2	e-book/ e-booklet/ e-manual	67	47	65
3	Manual	60	69	62
4	Brochure	56	34	73
5	Posters	56	58	46
6	Book	44	79	54
7	Pamphlets	42	39	65
8	Flyer	38	37	46
9	Infographics	31	26	35

16.1.6. Modes of Training

The TNA survey also evaluated the most effective modes of training for capacity building of the SFD and other Line Departments. The analysis of the data indicates that the physical mode comprising interactive sessions such as expert lectures, audio-visual presentations, hands-on exercises, case studies, and group activities, was ranked as a 'high' priority by SFD officers, frontline staff and other line departments. The virtual mode which includes similar interactive sessions, was generally rated as either 'medium' or 'high' priority by all three respondent groups. Meanwhile, the e-learning mode received a 'low' priority ranking across all categories of respondents. The corresponding results are presented in Tables 17, 18 and 19 and illustrated in Fig. 7.

Table 17: Preferences for modes of training by officers of State Forest Department

S. No·	Modes of Training	Priority %		
		Low	Medium	High
1	Physical mode	0	09	91
2	Virtual mode	27	60	13
3	e-Learning	53	36	11

Table 18: Preferences for modes of training by front line staff of State Forest Department

S. No·	Modes of Training	Priority %		
		Low	Medium	High
1	Physical mode	07	39	54
2	Virtual mode	23	51	26
3	e-Learning	34	33	34

Table 19: Preferences for modes of training by officers and staff of Other Line Departments

S. No·	Modes of Training	Priority %		
		Low	Medium	High
1	Physical mode	00	12	88
2	Virtual mode	19	58	23
3	e-Learning	42	42	15

16.1.7. Suitable Months and Duration for Conducting Training Sessions

Analysis of the Training Needs Assessment data, as illustrated in Fig. 8, indicates a clear preference for conducting training sessions during the months of August to January. Specifically, between 42% and 84% of respondents from the Officer and Frontline Staff of SFD, and between 30% and 60% of respondents from other line departments, identified this period as most suitable for training activities. This trend suggests a seasonal inclination, likely influenced by operational workloads and programmatic cycles within the respective departments.
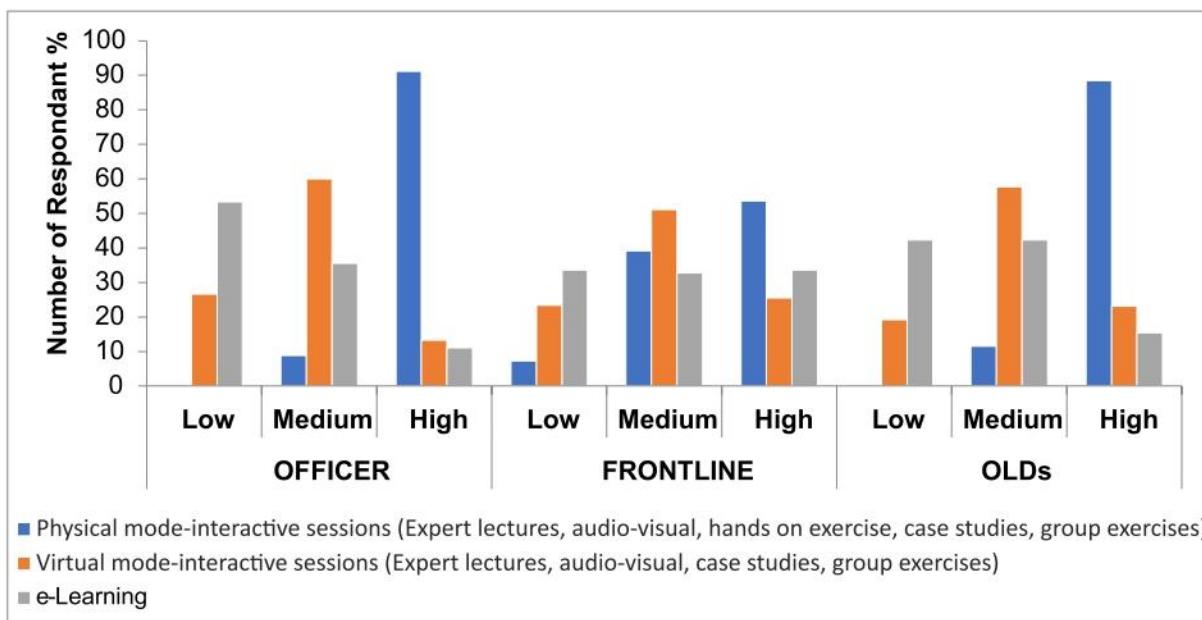
Fig. 7: Preference for mode of training
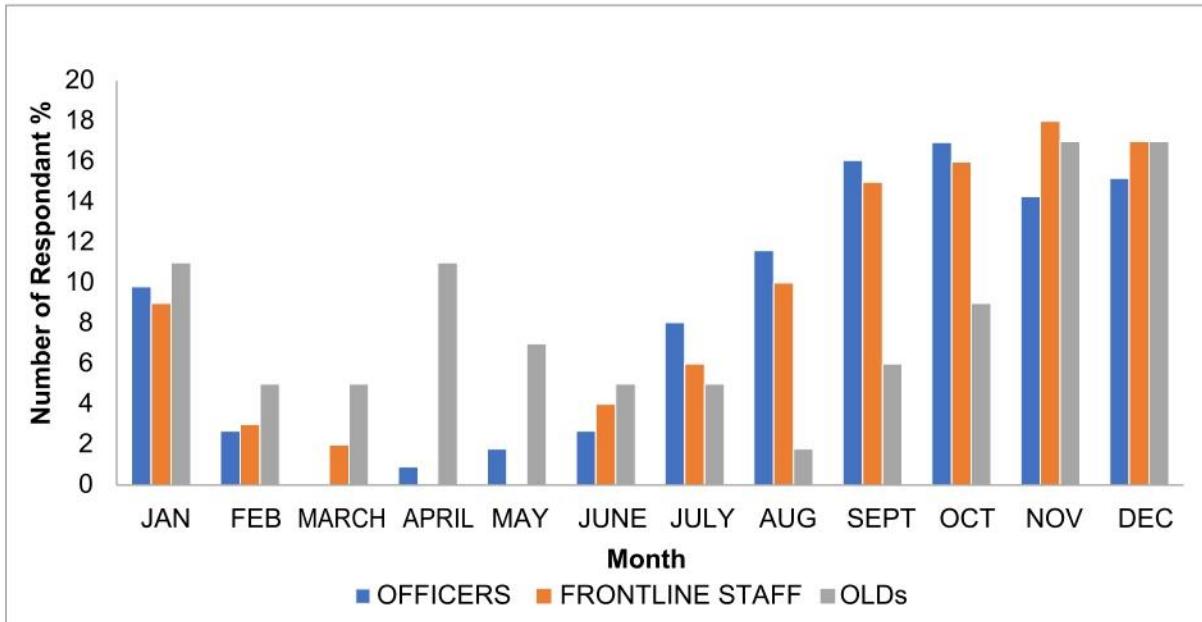
Fig. 8: Preference for suitable month for conducting training sessions

The analysis of training duration preferences indicates a varied response across different groups. Among the State Forest Department personnel, between 24% and 42% of the officers, and 23% to 65% of the frontline staff, preferred either a 5 days or 3 days training programme. This variation suggests differing needs or availability across officers and frontline staff of State Forest Department. In comparison, a significant 73% of respondents from Other Line Departments showed a clear preference

for a 5 days training programme. These results highlight a general inclination towards shorter-duration training formats, with the 5 days option being the most commonly favoured. The detailed distribution of these preferences is illustrated in Fig. 9.
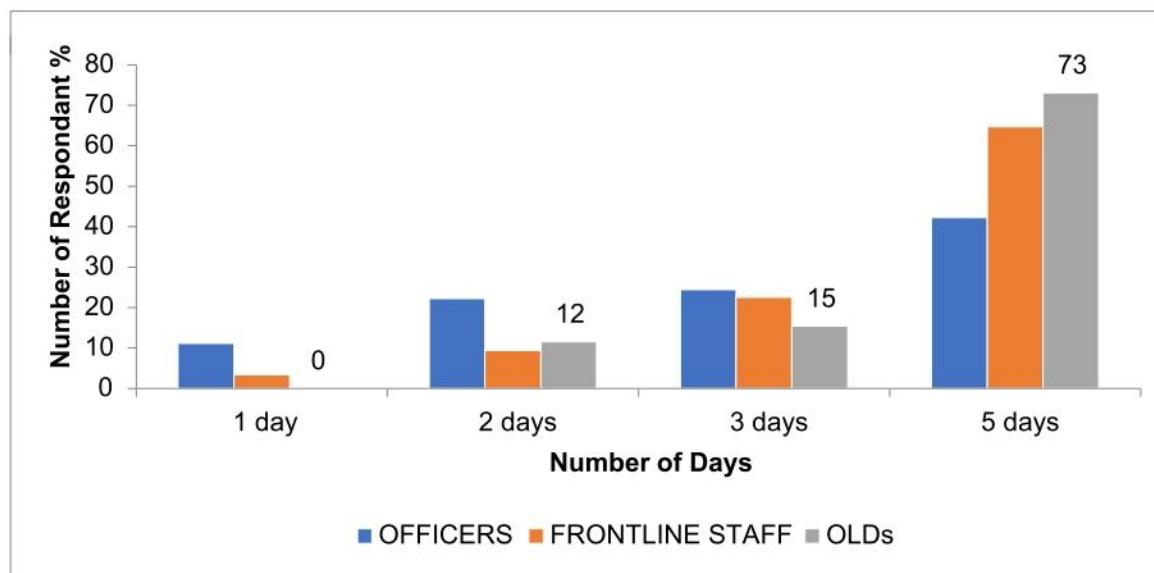
Fig. 9: Preference for duration of training

16.2. FAMILIARITY WITH FOREST LANDSCAPE RESTORATION AND RELATED TOPICS: LOCAL COMMUNITIES

Data collected from 825 respondents highlights a significant gap in community awareness. Alarmingly, over 99% of participants have neither attended nor are aware of key topics such as spring shed management, eco-tourism, disaster risk management, climate change and its impacts, and biodiversity conservation. Additionally, 89% of respondents lack familiarity specifically with ecotourism practices. A substantial majority ranging from 74% to 93%—did not participate in awareness programs related to value addition of agricultural products, value addition of non-wood forest produce, farm forestry practices, livelihood generation through non-timber forest products, community forest management, restoration of degraded forest land, sustainable land management practices and agroforestry. Moreover, 60% to 68% of respondents demonstrate limited knowledge concerning forest fire management, horticulture, and agricultural practices. These findings underscore an urgent need for enhanced education and outreach efforts, as detailed in Table 20.

Table 20: Response percentage of awareness for topics related to FLR

S. No.	Awareness Program	Unfamiliar (Responses in %)
1	Spring shed management	100
2	Eco-tourism	100
3	Disaster risk management	99
4	Climate change and its impacts	99
5	Biodiversity conservation	95
6	Value addition of agricultural products	93
7	Value addition of Non-Wood Forest Produce	91
8	Farm forestry practices	90
9	Livelihood generation through non-wood forest products	89
10	Community forest management	84
11	Restoration of degraded forest land	83
12	Sustainable land management practices	77
13	Agroforestry	74
14	Forest fire management	68
15	Horticulture	66
16	Agriculture practices	60

16.2.1. Awareness on Soil and Water Conservation Measures and Practices

The data on soil and water conservation measures within the community reveals that 56% of residents engage in farm bunding. Additionally, between 38% and 41% of community members practice crop rotation, drip irrigation, and mixed farming. In contrast, only 11% of respondents report using mulching, 7% utilize sprinkler irrigation, and just 4% practice organic farming. Practices such as rainwater harvesting, terrace farming, and contour or staggered trenching are virtually absent from the community. The findings are summarized in Table 21.

Table 21: Response of local community members who used Soil and Water Conservation practices

S. No.	Soil and water conservation practices used	Response (in %)
1	Farm bunding	56
2	Crop rotation	41
3	Drip irrigation	40
4	Mixed cropping	38
5	Mulching	11
6	Sprinkler irrigation	7
7	Organic farming	4
8	Rain water harvesting	1
9	Terrace farming	0
10	Contour/ staggered trenches	0

16.2.2. Awareness on Changes in Climate Patterns

As part of the study, respondents were asked to provide their perceptions of changes in climate patterns within the landscape. This included observations on the frequency of floods, rainfall, the occurrence of droughts and noticeable increases in temperature. Additionally, participants were queried about shifts in rainfall patterns over the past decade. Their responses offer valuable insight into local experiences of climate variability. A summary of the findings related to these observed changes is presented in Table 22.

The data presents an analysis of perceived changes in climate patterns, highlighting several key trends reported by respondents. A strong majority (80%) indicated that droughts have become more frequent, while 75% observed a noticeable increase in temperature. Similarly, 79% of respondents believe that flood occurrences have risen over time. In addition, a significant proportion reported a notable decrease in rainfall patterns over the past decade. Overall, these findings suggest a clear perception of a shifting climate characterized by more frequent droughts, rising temperatures, and reduced rainfall. Such changes may have serious implications for water availability, agricultural productivity, and disaster risk management in the region.

Table 22: Response of local community members about changes in climate

S. No.	Changes in climate changes	Yes (%)
1	Drought increased (frequency)	80
2	Drought decreased (frequency)	20
3	Change in temperature pattern (Increase)	75
4	Change in temperature pattern (Decrease)	25
5	Flood increased (frequency)	79
6	Flood decreased (frequency)	21
7	Change in rainfall pattern (Increase)	23
8	Change in rainfall pattern (Decrease)	77

16.2.3. Awareness on Changes in Quality of Forests

The data analysis reveals a concerning trend in forest quality as perceived by local communities. A significant majority reported high levels of forest degradation, indicating a decline in overall forest health. The spread of weeds and invasive species has notably increased, disrupting native ecosystems and exacerbating ecological imbalance. Alarming declines were reported in plant species diversity (92%) and natural regeneration (92%), signalling substantial biodiversity loss and

reduced forest resilience. Furthermore, 93% of respondents observed a reduction in the availability of non-wood forest products such as fruits and honey, which directly impacts local livelihoods and food security. Only 6% of respondents noted a decrease in invasive species, underscoring the limited success in controlling their spread. These findings collectively point to severe ecological stress, marked by the dominance of invasive species, diminished biodiversity and weakening forest sustainability. Addressing these issues will require targeted forest management strategies that prioritize invasive species control, biodiversity conservation and the promotion of natural regeneration. The villagers' observations regarding changes in forest quality over the past 20 years are summarized in Table 23.

Table 23: Change in Forest Quality observed by local community

S. No.	Changes in forest quality	Yes %
1	Increase in weeds/ invasive species in the forest	94
2	Decrease in weeds/ invasive species in the forest	06
3	Reducing NWFPs – (fruits, Honey, etc.)	93
4	Natural regeneration reduced	92
5	Plant species reduced	92
6	Forest degraded	92
7	Trees felling	90
8	Improving the quality of forests	07

16.2.4. Awareness on Occurrence of Forest Fire

The data indicates that forest fires are widespread, with 92% of respondents reporting being affected in some capacity. This high overall occurrence, coupled with notable representation across nearly all frequency categories, underscores that forest fires are neither rare nor isolated events. A majority (56%) reported experiencing forest fires once per year, suggesting that annual incidents are a common reality. This pattern may reflect environmental conditions where a single fire often triggers subsequent events, potentially due to climate variability or inadequate forest management.

While a smaller portion (16%) reported experiencing forest fires three times per year, this group is significant as it reflects chronic exposure. Such repeated occurrences may signal ecological stress zones or regions lacking effective prevention and response strategies. Investigating the factors behind this heightened frequency is essential, as it may be linked to geographical fire hotspots or socio-economic conditions that influence vulnerability and resilience. These findings are detailed in Table 24.

Table 24: Percentage of local community members about occurrence and frequency of Forest Fire

Occurrence Forest Fire (Yes %)		
Forest Fire Occurrence		92
Annually	Once	56
	Twice	24
	Thrice	11
	More than thrice	0

16.2.5. Community-based Institutions

All the surveyed villages have established Joint Forest Management Committees (JFMCs). In Maharashtra, JFMCs operate under the framework of Joint Forest Management (JFM), a participatory approach in which local communities collaborate with the Forest Department to manage and protect forest resources. This initiative is governed by both national guidelines and state-specific policies issued by the Maharashtra Forest Department.

Women play a critical role in various aspects of forest conservation and sustainable resource use under the JFM framework. They are actively involved in the collection of fuelwood, fodder, and Non-Wood Forest Products (NWFPs), contributing significantly to forest protection and management. Additionally, these activities support income generation,

thereby enhancing the economic resilience of their households. Their active participation not only strengthens local communities but also promotes the sustainable management of forest resources. Furthermore, all the surveyed villages have established Biodiversity Management Committees which can play a key role in conserving local biodiversity.

Each village was also found to have between 2 and 50 Self-Help Groups all of which were led by women. SHGs empower women by providing a platform for financial inclusion, skill development, and collective decision-making, leading to both economic and social empowerment. Through SHGs, women are able to save money, access microcredit, and initiate small businesses, contributing to poverty alleviation and increased household income. Beyond economic benefits, SHGs also promote social cohesion, leadership development, and awareness of rights, enabling women to participate more actively in community development and decision-making processes. These women-led SHGs are a testament to the leadership potential of women and their growing role in economic and community life.

16.2.6. Livelihood Opportunities from Forest in the Landscape Area

In Junnar, Maharashtra, rural livelihoods are closely intertwined with forest resources, presenting both opportunities and challenges. Local communities frequently depend on forests for their daily subsistence, collecting resources such as firewood, fodder, medicinal plants, and various non-wood forest products. Commonly harvested items include fruits like jamun, aonla and several citrus varieties, as well as medicinal plants like adhatoda and acorus. These forest assets are essential not only for household needs but also as potential sources of income through local markets or sales to urban buyers. Similarly, in the rural regions of Parola, Muktainagar and Chalisgaon, forest-based livelihoods offer significant economic opportunities. Residents engage in activities such as NWFP collection, agroforestry, and participation in government schemes like the Mahatma Gandhi National Rural Employment Guarantee Act. The forests provide main resources such as firewood, fodder, medicinal plants, tendu leaves, bamboo, and more which support both daily living and income generation. Communities collect and sell a wide range of NWFPs, including fruits, vegetables, roots, leaves, and medicinal plants. Notable examples include Mahua flowers and seeds, Char nuts, and forest honey. These products are either sold in local markets or to intermediaries, contributing to rural incomes.

In the rural regions of Rajura and Ballarpur, forests provide numerous livelihood opportunities through the collection and sale of forest produce such as bamboo, firewood, and honey. These forest-based livelihoods are often combined with agriculture and livestock rearing, as forests supply essential grazing areas and fodder for animals. Many community members depend on harvesting and marketing forest products like bamboo, firewood, gums, and honey, especially during the summer months. Ballarpur's forests are rich in bamboo cover, supporting both traditional bamboo crafts and modern industries. Rural artisans and entrepreneurs use bamboo to make household items, poles for orchards, and other products, creating employment and income opportunities.

In Sangamner, rural livelihoods are closely linked to forest resources, offering opportunities in honey collection, timber gathering, and livestock grazing. Medicinal plants, nuts, honey, and other valuable forest products provide important sources of livelihood. Tribal communities particularly collect and sell mahua flowers, seeds, nuts and wild honey in local markets.

16.2.7. Measures Suggested for Improving Forest Quality by Local Community

To improve forest quality in the selected modal sites of Maharashtra, local community members have suggested a comprehensive, multi-faceted approach focusing primarily on afforestation, reforestation, and sustainable forest management. Central to this approach is the promotion of native tree species, which are well-adapted to local climate and soil conditions and essential for maintaining biodiversity and ecosystem health. Engaging local communities through Gram Panchayats and Joint Forest Management Committees, along with providing technical support and resources, is crucial for successful afforestation efforts. Additionally, planting trees along roads, railway lines and canal banks can create green corridors that help prevent soil erosion and enhance habitat connectivity. Integrating trees into agricultural systems through agroforestry practices not only improves soil health and biodiversity but also diversifies farmers' income sources. To protect forest ecosystems, organic pest and insect control methods need to be encouraged. In grazing areas, introducing improved fodder grasses can increase pasture productivity and sustainability. Soil and moisture conservation measures such as terracing, contour trenching, check dams, percolation pits and rainwater harvesting are suggested to reduce erosion and improve water availability.

16.2.8. Awareness on Agroforestry Practices

Agroforestry practices in Maharashtra encompass the cultivation of a diverse range of tree and horticultural species. Common tree species include Moringa, Neem, Teak, Bamboo, Ailanthus, various Acacia species, and Eucalyptus. Fruit-bearing trees such as ber, amla, jamun and tamarind are also widely planted. In Sangamner (Ahilya Nagar district), horticultural crops like mango, lime, pomegranate, and guava are predominant. Muktainagar (Jalgaon district) is especially known for banana cultivation, particularly the Dwarf Cavendish variety, alongside sweet orange, guava and floriculture crops including roses, chrysanthemums and marigolds. The region also grows spices such as chillies, ginger and turmeric. In Junnar regions, major agricultural products include mango, banana, grapes, guava, various vegetables like potato, onion and tomato as well as spices and fruits such as pomegranate, sapota and custard apple. In Ballarpur, the focus is on mango, citrus fruits, guava, vegetables, floriculture and commercial crops including cotton, sugarcane, turmeric and oilseeds.

16.2.9. Topics Suggested for Capacity Building of Local Communities on FLR and Related Topics

During the Focus Group Discussion, participants were asked to identify their priority areas for capacity building and training related to the restoration of degraded forest landscapes. The local community highlighted key topics such as human-wildlife conflict management, improved horticultural and agricultural practices, sustainable land management, soil and water conservation and the management of invasive weeds. In addition to these priorities, community members also suggested a range of complementary topics, including livelihood development through non-wood forest products, restoration of degraded forest lands, agroforestry and farm forestry practices, forest fire prevention and control, disaster risk management, community-based forest management, and understanding the impacts of climate change along with mitigation and adaptation strategies. A comprehensive list of the topics suggested is presented in Table 25.

Table 25: Topics suggested for capacity building on FLR and related topics

S. No.	Suggested Topics for capacity building	Yes (%)
1	Human wildlife conflicts	75
2	Horticulture/agriculture practices	66
3	Sustainable land management practices	64
4	Soil and water conservation	61
5	Invasive species management	47
6	Livelihood generation through non-wood forest products	41
7	Restoration of degraded forest land	40
8	Agroforestry/ farm forestry practices	38
9	Forest fire management	32
10	Disaster risk management	27
11	Community forest management	26
12	Climate change and its impacts, climate change mitigation and adaptation	25

16.2.10. Choice of Mode of Training

More than 70% of the local community members indicated a strong interest in receiving training through a structured approach, beginning with classroom lectures, and subsequently supported by audio-visual presentations, exposure visits, and hands-on demonstrations. This preference is detailed in Table 26.

Table 26: Preferences for Mode of Training

S. No .	Mode of capacity building	Yes (%)
1	Classroom lectures followed by audio-visual	74
3	Exposure visits	71
2	Demonstrations	70

16.2.11. Suitable Months for Conducting Training

Most local community members indicated that the most suitable months for conducting trainings are October, December, January, February, March, April and May. These responses are presented in Table 27 and illustrated in Figure 9.

Table 27: Percentage of villagers for best suitable time of the year for conducting trainings

	Suitable Month for Conducting Training	Yes (%)
1	January	26
2	February	19
3	March	46
4	April	64
5	May	57
6	June	25
7	July	5
8	August	7
9	September	13
10	October	17
11	November	9
12	December	17
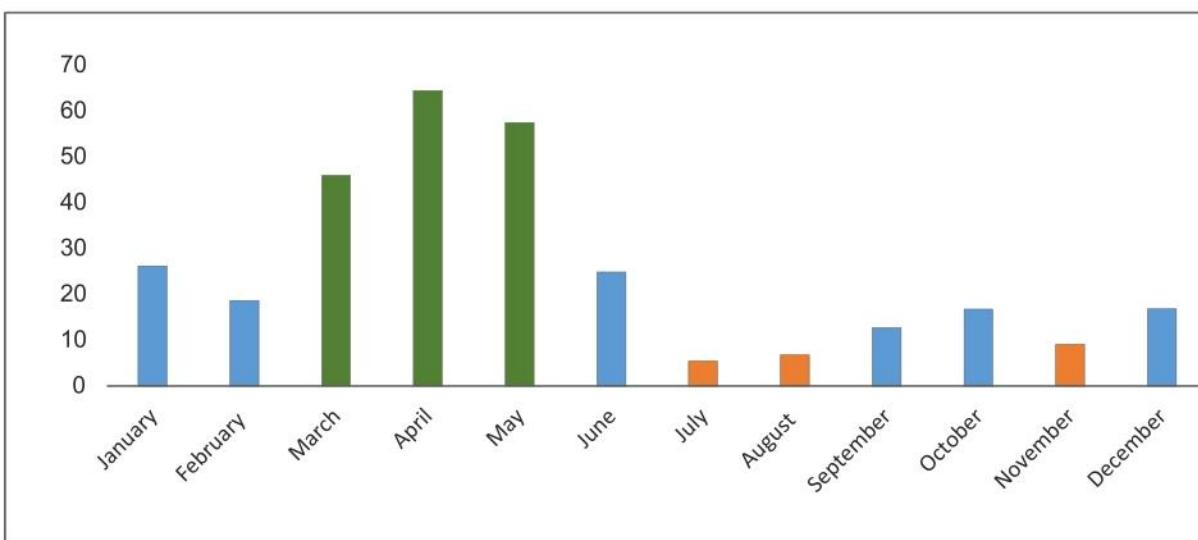
Figure 9: Choice of a suitable month for conducting training

16.2.12. Suggestions Related to Training Needs of Local Community

To effectively build the capacities of local communities in the surveyed villages, comprehensive training programs should be implemented covering essential agricultural techniques such as soil health management, crop diversification, integrated pest control, water harvesting and sustainable irrigation methods. Farmers should also be equipped with skills in processing, packaging and marketing their produce to increase income and reduce post-harvest losses. Promoting agroforestry practices will help diversify income sources and enable the sustainable use of non-wood forest products for value addition and improved livelihoods. Specialized horticulture training focusing on propagation, pruning, irrigation and fertilization is also crucial to enhance productivity. Additionally, training on water conservation, water harvesting and efficient irrigation practices will help communities cope with water shortages and drought. Emphasizing sustainable soil fertility techniques like composting, manuring and cover cropping will further improve soil health. To maximize the effectiveness of these efforts, training programs must incorporate local knowledge, traditional practices and be delivered in the local language to ensure they are relevant, accessible and impactful.

17 DEVELOPMENT OF TRAINING MODULES ON FOREST LANDSCAPE RESTORATION FOR STATE FOREST DEPARTMENT, OTHER LINE DEPARTMENTS AND LOCAL COMMUNITIES

Based on the findings of the Training Needs Assessment, targeted training modules on Forest Landscape Restoration and related topics have been developed to strengthen the capacity of State Forest Departments, Other Line Departments and local communities of Maharashtra, as outlined below:

17.1. TRAINING MODULE ON FOREST LANDSCAPE RESTORATION (FLR) FOR FOREST OFFICERS (RANGE FOREST OFFICERS AND ABOVE) OF STATE FOREST DEPARTMENT

Session 1: Introduction to Forest Landscape Restoration

- Principles and pillars of FLR
- FLR in the Indian context (NDCs, Bonn Challenge)

Session 2: Measurement of Forest Carbon Stocks

- Concepts of carbon pools: Aboveground, belowground, litter, deadwood, soil
- Tools and techniques (field plot layout and recording of data)
- Methods and application of remote sensing
- Hands-on carbon measurement exercise using sample data

Session 3: Climate Change in Forest Sector

- Impacts and vulnerabilities of forests to climate change
- Climate change mitigation and adaptation in forests
- Forest-based climate change vulnerabilities and adaptation measures

Session 4: REDD+ Mechanism

- REDD+ mechanism under UNFCCC
- National REDD+ Strategy
- REDD+ Safeguards
- Forest Reference Level
- National Forest Monitoring System
- Case study of REDD+ pilot project

Session 5: International Conventions and India's Commitments

- UNFCCC, UNCCD, CBD, UNFF
- India's NDCs, Land Degradation Neutrality targets, Global Biodiversity Framework, National Biodiversity Strategy and Action Plan

Session 6: Carbon Markets for Forestry Projects

- Carbon markets (compliance and voluntary markets)
- Carbon offset project development lifecycle
- Carbon registries and carbon trading
- Indian Carbon Market

Session 7: Gender Mainstreaming in FLR

- Role of gender in forest management
- Gender-responsive planning and monitoring

Session 8: Forest Certification
- Principles and certification mechanism for sustainable forest management

Session 9: Valuation of Ecosystem Services
- Concept of ecosystem services
- Valuation methods for ecosystem services

Session 10: Green Credit Programme (GCP)
- Overview of India's GCP framework
- Eligible activities and implementation modalities

Session 11: Springshed Management
- Importance of springs for local communities
- Spring inventorying and mapping
- Recharge techniques and catchment protection

Session 12: Funding Mechanisms for FLR
- CAMPA, GIM, NABARD, CSR, GCF, GEF, UNDP, JICA etc.
- Proposal writing and financial reporting essentials

Session 13: Nature-based Solutions/ Approaches and NWFPs Value Chains
- Nature-based solutions/ approaches for FLR
- Sustainable harvesting, processing and marketing of NWFPs
- Promoting community enterprise and value addition

17.2. TRAINING MODULE ON FOREST LANDSCAPE RESTORATION FOR FRONTLINE FOREST STAFF (FOREST GUARDS UP TO FORESTERS) OF STATE FOREST DEPARTMENT

Session 1: Forest Landscape Restoration – Concept and Approach
- Definition and principles of FLR
- Restoration vs afforestation
- Importance of multi-stakeholder and participatory approaches in FLR
- Integrated FLR Planning, tools and techniques
- Cross-sectoral coordination
- Monitoring and evaluation indicators

Session 2: India's Nationally Determined Contributions (NDCs) under the Paris Agreement
- Paris Agreement
- Overview of India's NDCs
- NDC Forest Sector target

Session 3: Measurement of Forest Carbon Stocks
- Forest carbon stocks and carbon pools
- Methods, tools and techniques for measurement of forest carbon stocks
- Application of GIS and remote sensing in measurement of forest carbon stocks
- Hands-on exercise on measurement of forest carbon stocks using sample data

Session 4: Springshed Management
- Importance of springs for local communities
- Spring inventorying and mapping

- Recharge techniques and catchment protection

Session 5: Nature-based Solutions/Approaches

- Definition, principles of nature-based solutions/approaches
- Monitoring, evaluation and scaling up of nature-based solutions/approaches
- Financing project on nature-based solutions/approaches
- Case studies

Session 6: Sustainable Harvesting of NWFPs and Livelihoods

- NWFP inventory and value chains
- Guidelines for sustainable harvesting
- Market linkages and community enterprises

Session 7: Gender Mainstreaming in FLR

- Role of gender in forest management/FLR
- Gender-responsive planning and monitoring

Session 8: Invasive Species and their Management

- Major invasive species
- Ecological impacts
- Control measures

Session 9: Integrated FLR Planning

- Landscape-level planning: tools and techniques
- Cross-sectoral coordination
- Monitoring and evaluation indicators

Session 10: Action Plan Preparation

- Preparation of FLR action plan

17.3 TRAINING MODULE ON FOREST LANDSCAPE RESTORATION FOR OFFICERS AND STAFF OF OTHER LINE DEPARTMENT

Session 1: International Agreements and Conventions on Environment

- UNFCCC, CBD, UNCCD, Paris Agreement, SDGs
- Bonn Challenge, New York Declaration on Forests

Session 2: Legal Framework for Environmental Protection in India

- Forest (Conservation) Act, 1980
- Environment (Protection) Act, 1986
- Biological Diversity Act, 2002
- Wildlife (Protection) Act, 1972
- Green Credit Rules, 2023

Session 3: Invasive Species and Their Management

- Major invasive species in India
- Ecological and economic impacts
- Measures for control of invasive species

Session 4: Introduction to Forest Landscape Restoration

- Principles and pillars of FLR
- FLR in the Indian context (NDCs, Bonn Challenge)

Session 5: Spring Shed Management

- Concept of springshed
- Hydrogeology basics
- Community-based springshed management

Session 6: Gender Mainstreaming in FLR

- Role of gender in FLR
- Gender-responsive planning and monitoring

Session 7: Eco-tourism

- Introduction to ecotourism
- Ecotourism planning and development
- Ecotourism in conservation of forests and biodiversity

Session 8: LiFE (Lifestyle for Environment) Mission

- Concept and objectives
- Individual and institutional behavioural changes
- Integration with departmental activities

Session 9: Sustainable Livelihood Generation

- Sustainable harvesting of NWFPs
- Value addition, storage and market linkages

Session 10: Agroforestry/ farm forestry/ urban forestry

- Definition and components of agroforestry
- Historical practices and indigenous knowledge
- Agroforestry models

17.4. AWARENESS AND TRAINING PROGRAM MODULE ON FOREST LANDSCAPE RESTORATION AND RELATED CONCEPTS FOR LOCAL COMMUNITIES

Session 1: Introduction to Forest Landscape Restoration

- Forest landscape
- Causes of forest landscape degradation
- Forest landscape restoration (definition, goals)
- Importance of forest landscape restoration

Session 2: Improved Agriculture Practices

- Organic farming
- Biopesticides
- Crop diversification

Session 3: Sustainable land management practices

- Soil Moisture Conservation - Mulching, bunding, terracing, Chauka System, Taanka System etc.

- Micro-irrigation – Drip and Sprinkler
- Crop residue management

Session 4: Agroforestry, Farm Forestry and Horticulture Practices
- Agroforestry and its benefits
- Agroforestry models
- Sustainable horticulture practices

Session 5: Mitigating Human-Wildlife Conflicts: Tools and Techniques
- Understanding human-wildlife conflict
- Wildlife behaviour and identification
- Non-lethal conflict mitigation techniques
- Emergency response and safety protocols
- Compensation mechanisms and reporting
- Community-based conflict management

Session 6: Invasive species management
- Major Invasive species
- Control and management

18   CONCLUSION

The Training Needs Assessment (TNA) has provided valuable insights into the existing knowledge and skill gaps, as well as the capacity development needs of key stakeholders involved in the restoration of degraded forest landscapes in Maharashtra. While there is a broad awareness among stakeholders regarding the importance of forest landscape restoration (FLR), the assessment highlights critical gaps in understanding core FLR principles, landscape-level planning, restoration monitoring, climate resilience strategies, and community engagement. Other Line Departments, although playing a vital and complementary role in FLR efforts, often operate in silos, lacking coordination and a shared vision for restoration. The TNA underscores the need to strengthen inter-departmental collaboration through targeted capacity-building interventions. These efforts should promote cross-sectoral coordination, policy coherence, and integrated landscape management approaches to foster a unified and effective restoration agenda. At the community level, there is a strong willingness to engage in restoration initiatives. However, significant gaps exist in technical knowledge particularly in practical restoration techniques, sustainable resource management, and institutional procedures. Capacity development at this level should focus on raising awareness, enhancing practical skills, and promoting inclusive governance models to ensure meaningful and sustained community participation. Overall, the TNA underscores the urgent need for stakeholder-specific, targeted training modules on FLR. Building the capacities of all relevant stakeholders is critical not only for the effective implementation of FLR initiatives but also for enhancing ecosystem services, strengthening climate resilience, and supporting sustainable livelihoods across Maharashtra.

19   WAY FORWARD

Training modules on forest landscape restoration (FLR) have been developed as part of the Training Needs Assessment conducted to support capacity building for the State Forest Department, other line departments, and local communities in Maharashtra. With the development of these modules completed, the next critical step is their effective implementation, institutional uptake, and long-term integration into the capacity-building programmes of relevant stakeholders. The focus must now shift from planning to action, with emphasis on the systematic rollout of trainings across multiple stakeholder levels and selected landscapes under the RECAP4NDC Project within the state.

To begin this process, a phased training implementation plan should be developed. Special attention must be given to strengthening the capacities of frontline forest staff, community members, and representatives of Panchayati Raj Institutions (PRIs). These groups play a pivotal role in on-ground FLR interventions and must be equipped not only with technical knowledge but also with participatory planning and governance skills to foster inclusive, community-led restoration efforts.

To ensure sustainability and scalability of the training programme, a training of trainers approach can be operationalized using the developed modules. By building a cadre of master trainers at the Forest Division level, Maharashtra can establish a self-sustaining model where capacity building becomes a continuous, embedded process. These master trainers can serve as key resource persons to extend the outreach and impact of FLR trainings across the state.

Further, integrating the FLR training modules into the regular induction and in-service training curricula of the State Forest Department and other line departments will help institutionalize the knowledge and practices, making restoration a core component of departmental functioning. This long-term integration is essential for embedding FLR principles within the operational culture of institutions responsible for landscape management.

Additionally, to extend the reach and accessibility of the training, technology-enabled platforms should be leveraged. Digital learning tools, mobile-based training content and community radio can be effective in engaging stakeholders in remote or underserved areas, while also promoting continued learning beyond the classroom setting. These approaches will help create an inclusive and adaptive training ecosystem that supports effective Forest Landscape Restoration across Maharashtra.

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GLIMPSES OF THE TNA SURVEYS - OFFICERS OF SFD

GLIMPSES OF THE TNA SURVEYS - FRONTLINE STAFF OF SFD

GLIMPSES OF THE TNA SURVEYS - LOCAL COMMUNITIES

ANNEXURE 1

QUESTIONNAIRE FOR TRAINING NEED ASSESSMENT FOR CAPACITY BUILDING OF THE OFFICERS OF STATE FOREST DEPARTMENT ON FOREST LANDSCAPE RESTORATION UNDER RECAP4NDC PROJECT

No: TNA-Q1/ICFRE/   **Date:**

Name of the Project: Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC Project)

Project Output V: Development of Capacities, Knowledge and Communication Mechanisms for Forest Landscape Restoration

Implementing Agency: Indian Council of Forestry Research and Education (ICFRE), Dehradun

Brief About the Project: German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection has commissioned a project titled Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) under International Climate Initiative. The project is being implemented as part of the Indo-German Partnership for Green and Sustainable Development by a six-member consortium (GIZ, IUCN, FSI, TERI, ICFRE and the ICIMOD). This project aims to enable actors to effectively plan, finance, implement and monitor forest landscape restoration (FLR) and trees outside forests measures. Thereby, it aims to contribute to the achievement of India's NDC forestry target, enhance biodiversity conservation and sustainably improve rural livelihoods through increased forest and tree cover. Output V aims to transfer knowledge and capacitate stakeholders. Capacity development includes trainings, induction courses/curricula development on Forest Landscape Restoration for public staff across different sectors and levels.

Informed Consent: You are requested to participate in the survey being conducted by ICFRE, Dehradun to determine the need of the training required for the capacity building of State Forest Department on various aspects of Forest Landscape Restoration under the RECAP4NDC Project.

Your contribution will help in identification and prioritization of training needs, preparation of training modules, manuals, knowledge products and building capacity of State Forest Departments on various aspects of Forest Landscape Restoration under the project.

There are no foreseeable risks for participating in this survey. You may withdraw your consent or stop participating in the survey at any time. We will make every effort to maintain the confidentiality of your responses. Only the team of the project will have access to the data and information about participation and will not be shared with others.

Details of Respondent:

Name: ……

Designation:………

Age:…………………………………………………………… Gender……………………………………………………………

Address:………

………

………

Mobile No…………………………………………………………… Email …………………………………………………………

1. **How familiar are you with the following topics related to Forest landscape restoration?**

   Kindly tick the appropriate option (Yes/ No) against each of the following:

S. No.	Topics related to forest landscape restoration	Yes	No
1	Forest landscape restoration		
2	Sustainable forest management		
3	Restoration of degraded forests/ landscapes		
4	Nursery and plantation techniques of forestry species		
5	Soil and water conservation measures		
6	Invasive species and their management		
7	Forest fire and its management		
8	Nature -based Solutions/Ecosystem based Approaches		
9	Climate change impact and vulnerability in forest sector		
10	Climate change mitigation and adaptation in forest sector		
11	REDD+ (Reducing emissions from deforestation and forest degradation) & Forest carbon projects		
12	Forest carbon stocks measurement		
13	Carbon Market Mechanism-Finance and Carbon Credit		
14	Forest certification		
15	International Agreement/ Conventions related to forest and environment & India's Commitment		
16	Sustainable harvesting of NTFP and their role in livelihood generation		
17	Ecosystem services and its Valuation		
18	Legal framework (Policies, laws and regulations) for conservation and protection of forest and environment		
19	Sustainable development goals		
20	Gender mainstreaming in forest management		
21	Community forest management (Van Panchayat/JFMCs/BMCs etc.)		
22	Springshed Management		
23	Eco-tourism		
24	Value Chain		
25	Green Credit Programme		
26	Domestic and International funding for FLR		
27	Life: Life style for Environment		

2. Trainings related to Forest Landscape Restoration attended by you:

S. No.	Name of training attended	Organizing Institution/ Department
1		
2		
3		
4		

3. Which schemes/projects/programs are being implemented in the state for restoration of degraded forest landscapes? What type of trainings are being provided to the staff under the scheme/project/program?

S. No.	Name of the scheme/project/program	Type of training provided to staff
1		
2		
3		
4		

4. Which types of practices are being followed in the department for restoration of degraded forest landscapes? Kindly tick (√) relevant option/options.

S. No.	Practices	Tick (√) relevant option/options
1	ANR– Enrichment plantation	
2	Soil & Moisture Conservation	
	a) Rain Water Harvesting	
	b) Contour trench	
	c) Cattle proof trench/wall	
	d) Check dams	
3	Fencing	
4	Invasive Species management	
5	Rotation grazing	
6	Forest Fire Management	
7	Others, if any, please specify	

5. Which type of knowledge products would be more effective for sharing of knowledge on restoration of degraded forest landscape? Kindly tick (√) relevant option/options.

S. No.	Type of knowledge products	Tick (√) relevant option/options
1	Flyer	
2	Book	
3	Manual	
4	Brochure	
5	Pamphlets	
6	Infographics	
7	Videos	
8	Posters	
9	e-book/ e-booklet/ e-manual	
10	Others, if any, please specify	

6. Which modes of training would be more effective for capacity building of the Department? Please suggest:

S. No.	Modes of training	Priority		
		Low	Medium	High
1	Physical mode - Interactive sessions (Expert lectures, audio-visual, hands on exercise, case studies, group exercises)			
2	Virtual mode- Interactive sessions (Expert lectures, audio-visual, case studies, group exercises)			
3	e-Learning			
4	Others, if any, please specify			

7. Please suggest best suitable time of the year for conducting trainings for the Department and appropriate duration of training:

Months:_____

Duration: (a) 1 day_____ (b) 2 days_____

(c) 3 days_____ (d) 5 days _____

8. Please provide other comments/suggestions related to training needs for capacity building of the Department on FLR related aspects:

_____

_____

Signature of the respondent

Signature ……………………………………………..

Data collected by: ……………………………………….

Designation: ……………………………………….

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ANNEXURE **2**

QUESTIONNAIRE FOR TRAINING NEED ASSESSMENT FOR
CAPACITY BUILDING OF THE FRONTLINE STAFF OF STATE FOREST DEPARTMENT
ON FOREST LANDSCAPE RESTORATION UNDER RECAP4NDC PROJECT

No: TNA-Q4/ICFRE/ Date:

Name of the Project: Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC Project)

Project Output V: Development of Capacities, Knowledge and Communication Mechanisms for Forest Landscape Restoration

Implementing Agency: Indian Council of Forestry Research and Education (ICFRE), Dehradun

Brief About the Project: German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection has commissioned a project titled Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) under International Climate Initiative. The project is being implemented as part of the Indo-German Partnership for Green and Sustainable Development by a six-member consortium (GIZ, IUCN, FSI, TERI, ICFRE and the ICIMOD). This project aims to enable actors to effectively plan, finance, implement and monitor forest landscape restoration (FLR) and trees outside forests measures. Thereby, it aims to contribute to the achievement of India's NDC forestry target, enhance biodiversity conservation and sustainably improve rural livelihoods through increased forest and tree cover. Output V aims to transfer knowledge and capacitate stakeholders. Capacity development includes trainings, induction courses/curricula development on Forest Landscape Restoration for public staff across different sectors and levels.

Informed Consent: You are requested to participate in the survey being conducted by ICFRE, Dehradun to determine the need of the training required for the capacity building of State Forest Department on various aspects of Forest Landscape Restoration under the RECAP4NDC Project.

Your contribution will help in identification and prioritization of training needs, preparation of training modules, manuals, knowledge products and building capacity of State Forest Departments on various aspects of Forest Landscape Restoration under the project.

There are no foreseeable risks for participating in this survey. You may withdraw your consent or stop participating in the survey at any time. We will make every effort to maintain the confidentiality of your responses. Only the team of the project will have access to the data and information about participation and will not be shared with others.

Details of Respondent:

Name: ....

Designation: ....

Gender .... Age ....

Qualification   a)   10th

                       b)   12th

                       c)   Graduation

                       d)   Post-graduation

                       e)   Others (specify)

Address:

Forest Division:...

Forest Range: ....

Mobile No.. Email ....

1. **How familiar are you with the following topics related to Forest landscape restoration?**
   Kindly tick the appropriate option (*Yes/ No*) *against* each of the following:

S. No.	Topics related to forest landscape restoration	Yes	No
1	Forest Landscape Restoration concept/Approach		
2	Sustainable forest management		
3	Restoration of degraded forests		
4	Nursery and plantation techniques of forestry species		
5	Soil and water conservation measures		
6	Invasive species and their management		
7	Forest fire and its management		
8	Nature-based Solutions/Approaches		
9	Forest carbon stocks measurement		
10	India's Nationally Determined Contribution targets under the Paris Agreement		
11	Policies, laws and regulations for conservation of forest biodiversity in India		
12	Sustainable harvesting of NTFP and their role in livelihood generation		
13	Legal framework for conservat ion and protection of forest and environment in India		
14	Gender mainstreaming in forest management		
15	Community forest management (Van Panchayat/JFMC/BMC/SHG)		
16	Spring shed Management		
17	Village eco-tourism		
18	Biodiversity Conservation		

2. **Trainings related to Forest Landscape Restoration attended by you:**

S. No.	Name of training	Organizing Agency/ Department
1		
2		
3		
4		

3. **Which types of practices are being followed by your department for restoration of degraded forest landscapes? (Please tick (√) relevant option/options)**

S. No.	Practices	Tick (√) relevant option/options
1	ANR– Enrichment plantation, adoption etc.	
2	Soil & Moisture Conservation	
	a) Rain Water Harvesting	
	b) Contour trench	
	c) Cattle proof trench/wall	
	d) Check dams	
3	Fencing	
4	Invasive Species management	
5	Rotation grazing	
6	Forest Fire Management	
7	Others, if any, please specify	

4. **Which type of knowledge products would be more effective for sharing of knowledge on restoration of degraded forest landscape? (Please tick (√) relevant option/options)**

S. No.	Type of knowledge products	Tick (√) relevant option/options
1	Flyer	
2	Book	
3	Manual	
4	Brochure	
5	Pamphlets	
6	Infographics	
7	Videos	
8	Posters	
9	e-book/ e-booklet/ e-manual	
10	Others, if any, please specify	

5. **Which modes of training would be more effective for capacity building for Frontlines Staff of State Forest Department? Please suggest:**

S. No.	Modes of training	Priority		
		Low	Medium	High
1	Physical mode- Interactive sessions (Expert lectures, audio-visual, hands on exercise, case studies, group exercises)			
2	Virtual mode-Interactive sessions (Expert lectures, audio-visual, case studies, group exercises)			
3	e-Learning			
4	Others, please specify…………………………………………………. ……………………………………………………………………… ……………………………………………—………………………			

6. **Please suggest best suitable time of the year for conducting trainings for the Department:**
   Months:_____
   Duration: (a) 1 day_____ (b) 2 days_____
   (c) 3 days_____ (d) 5 days _____

7. **Please provide other comments/suggestions related to training needs for capacity building of the Department:**
   _____
   _____
   _____

Signature of the respondent

Signature ……………………………………………

Data collected by: ……………………………………………

Designation: ……………………………………………

ANNEXURE 3

QUESTIONNAIRE FOR TRAINING NEED ASSESSMENT FOR CAPACITY BUILDING OF THE OFFICERS/ STAFF OF OTHER LINE DEPARTMENT ON FOREST LANDSCAPE RESTORATION UNDER RECAP4NDC PROJECT

No: TNA-Q2/ICFRE/   Date:

Name of the Project: Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC Project)

Project Output V: Development of Capacities, Knowledge and Communication Mechanisms for Forest Landscape Restoration

Implementing Agency: Indian Council of Forestry Research and Education (ICFRE), Dehradun

Brief About the Project: German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection has commissioned a project titled Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) under International Climate Initiative. The project is being implemented as part of the Indo-German Partnership for Green and Sustainable Development by a six-member consortium (GIZ, IUCN, FSI, TERI, ICFRE and the ICIMOD). This project aims to enable actors to effectively plan, finance, implement and monitor forest landscape restoration (FLR) and trees outside forests measures. Thereby, it aims to contribute to the achievement of India's NDC forestry target, enhance biodiversity conservation and sustainably improve rural livelihoods through increased forest and tree cover. Output V aims to transfer knowledge and capacitate stakeholders. Capacity development includes trainings, induction courses/curricula development on Forest Landscape Restoration for public staff across different sectors and levels.

Informed Consent: You are requested to participate in the survey being conducted by ICFRE, Dehradun to determine the need of the training required for the capacity building of other Departments on various aspects of Forest Landscape Restoration under the RECAP4NDC Project.

Your contribution will help in identification and prioritization of training needs, preparation of training modules, manuals, knowledge products and building capacity of your department on various aspects of Forest Landscape Restoration under the project.

There are no foreseeable risks for participating in this survey. You may withdraw your consent or stop participating in the survey at any time. We will make every effort to maintain the confidentiality of your responses. Only the team of the project will have access to the data and information about participation and will not be shared with others.

Details of Respondent:

Name: ....

Designation:...

Age:.. **Gender**...

Address:..
....

Mobile No.. **Email**...

1. **How familiar are you with the following topics related to Forest landscape restoration? Kindly tick the appropriate option (Yes/ No) against each of the following:**

S.No.	Topics related to forest landscape restoration	Yes	No
1	Natural resource management (NRM)		
2	Sustainable land management		
3	Restoration of degraded areas		
4	Soil and water conservation		
5	Nature-based Solution/Ecosystem based Approaches		
6	Invasive species and their management		
7	Disaster management/Disaster risk reduction		
8	Climate change impacts and vulnerability		
9	Climate change mitigation and adaptation		
10	International Agreement/Conventions related to environment		
11	Legal framework for conservation and protection of environment in India		
12	Sustainable livelihood generation		
13	Agroforestry/farm forestry/urban forestry		
14	Participatory natural resource management		
15	LiFE: Life Style for Environment		
16	Sustainable development goals		
17	Gender mainstreaming in NRM		
18	Spring shed management		
19	Eco-tourism		

2. **Contributions of Line Departments towards Forest Landscape Restoration. Please tick (√) relevant option/ options.**

S.No.	Department	Tick √ relevant option/options
1	**Rural Development Department**	
	a Soil Moisture Conservation	
	b Plantation	
	c Others, if any, please specify	
2	**Agriculture Department**	
	a Micro-irrigation	
	b Rashtriya Krishi Vikas Yojana	
	c Improved agricultural practices	

	d	Mulching	
	e	Organic farming	
	f	Rain water harvesting	
	g	Percolation tanks	
	h	Others, if any, please specify	
3		**Horticulture Department**	
	a	Plantation of horticultural crops	
	b	Micro-irrigation	
	c	Green house development	
	d	Percolation tanks	
	e	Rain water harvesting	
	f	Mulching	
	g	Others, if any, please specify	
4		**Watershed Management Department**	
	a	Plantation	
	b	Check dams	
	c	Irrigation	
	d	Livelihood	
	e	Others, if any, please specify	
5		**Irrigation and Water Resources Department**	
	a	Canals	
	b	Tube wells	
	c	Ponds	
	d	Micro-irrigation	
	e	Water harvesting	
	f	Chauka	
	g	Others, if any, please specify	
6		**Animal Husbandry Department**	
	a	Grassland development	
	b	Plantation of fodder trees/grasses	
	c	Controlled grazing	
	d	Stall feeding	
	e	Others, if any, please specify	

3. Trainings related to NRM attended by you:

S. No.	Name of training attended	Organizing Institution/ Department
1		
2		
3		
4		

4. Which types of sustainable land management practices are being followed by your department for restoration of degraded landscapes? Please tick (√) relevant option/options

S.No.	Name of the Practices	Tick (√) relevant
1	Organic farming	
2	Micro-irrigation	
3	Rain Water Harvesting	
4	Improved variety of seed distribution	
5	Quality Planting Materials	
6	Land-levelling	
7	Chaukas practice	
8	Agroforestry	
9	Farm Bunding	
10	Others, if any, please specify	

5. Which type of knowledge products would be more effective for sharing of knowledge on restoration of degraded landscape? Kindly tick (√) relevant option/options

S.No.	Type of knowledge products	Tick (√) relevant option/options
1	Flyer	
2	Book	
3	Manual	
4	Brochure	
5	Pamphlets	
6	Infographics	
7	Videos	
8	Posters	
9	e-book/ e-booklet/ e-manual	
10	Others, if any, please specify	

6. Which modes of training would be more effective for capacity building of your department? Please suggest:

S.No.	Modes of training	Priority		
		Low	Medium	High
1	Physical mode - Interactive sessions (Expert lectures, audio - visual, hands on exercise, case studies, group exercises)			
2	Virtual mode - Interactive sessions (Expert lectures, audio - visual, case studies, group exercises)			
3	e - Learning			
4	Others, please specify			

7. Please suggest best suitable time of the year for conducting trainings for your department and appropriate duration of training:
Months:_____
Duration: (a) 1 day_____ (b) 2 days_____
(c) 3 days_____ (d) 5 days _____

8. Please provide other comments/suggestions related to training needs for capacity building of your department:
_____
_____
_____

Signature of the respondent

Signature ……………………………………………

Data collected by: ……………………………………

Designation: …………………………………………

ANNEXURE 4

QUESTIONNAIRE FOR TRAINING NEED ASSESSMENT FOR CAPACITY BUILDING OF THE LOCAL COMMUNITIES ON FOREST LANDSCAPE RESTORATION UNDER RECAP4NDC PROJECT

No: TNA-Q3/ICFRE/   Date: /   /2025

Name of the Project: Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) Project

Project Output V: Development of Capacities, Knowledge and Communication Mechanisms for Forest Landscape Restoration

Implementing Agency: Indian Council of Forestry Research and Education (ICFRE), Dehradun

Brief About the Project: German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection has commissioned a project titled Restore, Conserve and Protect Forest and Tree Cover for NDC Implementation in India (RECAP4NDC) under International Climate Initiative. The project is being implemented as part of the Indo-German Partnership for Green and Sustainable Development by a six-member consortium (GIZ, IUCN, FSI, TERI, ICFRE and the ICIMOD). This project aims to enable actors to effectively plan, finance, implement and monitor forest landscape restoration and trees outside forests measures. Thereby, it aims to contribute to the achievement of India's NDC forestry target, enhance biodiversity conservation and sustainably improve rural livelihoods through increased forest and tree cover. Output V of the project aims to transfer knowledge and capacitate stakeholders. Capacity development includes trainings on Forest Landscape Restoration.

Informed Consent: You are requested to participate in the survey being conducted by ICFRE, Dehradun to determine the need of the training required for the capacity building of the local communities on various aspects of Forest Landscape Restoration under the RECAP4NDC Project.

Your contribution will help in identification and prioritization of training needs, preparation of training modules, manuals, knowledge products and building capacity of the local communities on various aspects of Forest Landscape Restoration under the project.

There are no foreseeable risks for participating in this survey. You may withdraw your consent or stop participating in the survey at any time. We will make every effort to maintain the confidentiality of your responses. Only the team of the project will have access to the data and information about participation and will not be shared with others.

Details of Village

Name of Village	
Population of Village	
No. of Males ………….. **No. of Females…………** Children (below age of 18 years)……………	
No. of Household:	
Gram Panchayat	

Tehsil	
Forest Range	
District	
State	
Comfortable in Language	(a) Hindi (b) English (c) Gujarati (d) Marathi

1. **Have you attended any awareness programs on following subject? (Please tick (✓)**

S. No.	Awareness on the subject	Yes	No
1	Restoration of degraded forest land		
2	Forest fire management		
3	Community forest management		
4	Sustainable land management practices		
6	6 (a). Agroforestry		
	6 (b). Farm forestry practices		
7	7 (a). Horticulture		
	7 (b). Agriculture practices		
8	Livelihood generation through Non-wood Forest Products		
9	Climate Change and its impacts		
10	Disaster risk management		
11	Spring shed management		
12	Eco -tourism		
13	Biodiversity conservation		
14	Value addition of agricultural products		
15	Value addition of Non - Wood Forest Produce		
16	Agriculture Practices		
17	Others, if any, please specify: 1. .... 2.		

2.   Which soil and water conservation measures are being followed by you? (Please tick (✓)

S. No.	Soil and water conservation measure practices	Yes	No
1	Organic Farming		
2	Terrace Farming		
3	Crop Rotation		
4	Mixed Cropping		
5	Rain Water Harvesting		
6	Mulching		
7	Contour/ Staggered Trenches		
8	Farm bunding		
9	Drip Irrigation		
10	Sprinkler Irrigation		
11	Others, if any, please specify: 1. ……… 2. ……		

3.   Have you observed any changes in climate patterns? (Please tick ✓)

S.No.	Changes in climate patterns	Yes	No
1	a) Flood –increased (frequency)		
	b) Flood –decreased (frequency)		
2	a) Drought –increased (frequency)		
	b) Drought – decreased (frequency)		
3	a) Cloud burst–increased (frequency)		
	b) Cloud burst – decreased (frequency)		
4	a) Change in rain fall pattern (Increase)		
	b) Change in rain fall pattern (Decrease)		
5	a) Change in snowfall pattern (Increase)		
	b) Change in snowfall pattern (Decrease)		
6	a) Change in temperature pattern (Increase)		
	b) Change in temperature pattern (Decrease)		
7	Others, if any, please specify: 1. …… 2. ……………………………………………………………………………………………………		

4. Have you observed any changes in forest quality in last 20 years in your areas? (Please tick ✓)

S. No.	Changes in forest quality	Yes	No
1	Trees felling		
2	Plant species reduced		
3	Forest Degraded		
4	a) Increase in Weeds/ invasive species in the forest		
	b) Decrease in Weeds/ invasive species in the forest		
5	Natural regeneration reduced		
6	Reducing NWFPs - (fruits, Honey, etc.)		
7	Improving the quality of forests		
8	Others, if any, please specify: 1. ……………………………………………………………………………………… 2. ………………………………………………………………………………		

5. Does forest fire occur in nearby forest areas?　　　　　　　| Yes | No |

If yes, please mention its frequency per year, Kindly tick ✓
(a)　Once　(b) Twice　(c) Thrice　(d) More than thrice

6. What control measures are being followed for controlling forest fire in your area?

1. _____

2. _____

7　Are you member of any of the following committee?

S.No.	Committee/group	Yes	No
i.	Joint Forest Management Committee (JFMC)		
	If yes, your role ………………………………………………………………… ………………………………………………………………… **Role of Women in JFMC** ………………………………………………………………… …………………………………………………………………		
ii.	Biodiversity Management Committee (BMC)	Yes	No
	If yes, your role ………………………………………………………………… ………………………………………………………………… **Role of Women in BMC** ………………………………………………………………… …………………………………………………………………		

iii.	Self Help Group (SHG)	Yes	No
	If yes, your role .... **Role of Women in SHG**		
iv.	Farmer Producer Organization (FPO)	Yes	No
	If yes, your role .... **Role of Women in FPO**		
v.	Mahila Mangal Dal	Yes	No
	If yes, your role		
vi.	Attended training programmes as member of above mentioned committees	Yes	No
	If yes, your role		
vii.	Details of important tasks performed by the above mentioned committees		
viii.	Others, if any, please specify:		

8. **Role of women in above mentioned committees/Group and Gram Panchayat**

   1. _____
   2. _____

9. **Livelihood opportunities from forest in your area?**

   1. _____
   2. _____

10. **Suggest any measures for improving forest quality in your areas.**

   1. _____
   2. _____

11. **Is agroforestry being practiced in your area? If yes, mention the tree species being used for agroforestry in your area.**

   1. _____
   2. _____

12. **Kindly tick (√) topics and suggest additional topics for capacity need on restoration of degraded landscape for local communities:**

S. No.	Suggested Topics for capacity building	Tick (√) your choice
1	Restoration of degraded forest land	
2	Forest fire management	
3	Community forest management	
4	Sustainable land management practices	
5	Agroforestry/ farm forestry practices	
6	Horticulture/agriculture practices	
7	Livelihood generation through Non-wood Forest Products	
8	Climate Change and its impacts, Climate Change Mitigation and Adaptation	
9	Disaster risk management	
10	Soil and water conservation	
11	Others, if any, please specify: ……… ………………………………………………………………………………	

13. **Which mode of training would be more effective for capacity building of local communities of your areas? Please suggest:**

S. No.	Modes of training	Tick (√) your choice
1	Classroom lectures followed by audio-visual	
2	Demonstrations	
3	Exposure visits	
4	Others, if any, please specify: …… ……	

14. **Please suggest best suitable time of the year for conducting trainings:**
Months:_____

15. **Please provide other comments/suggestions related to training needs for capacity building of local communities**
_____
_____
_____

16 **Details of ongoing or completed projects related to management of natural resources, agriculture, horticulture, industry, livelihood, biodiversity, soil and water conservation, animal husbandry etc. in your village**

S. No.	Name of the Project	Year	Department/ Organisation
1.			
2.			
3.			

Data collected by: ………………………………………………

Signature ……………………………………………

Designation ………………………………………

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INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION
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