

Global Environment Facility

Food and Agriculture Organization of the United Nations

**Green-Ag: Transforming Indian Agriculture for Global Environmental Benefits
and the Conservation of Critical Biodiversity and Forest Landscapes**

Strategy Paper

Landscape Assessment

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Description

1. Landscape Definition

- A landscape¹ is
 - a social-ecological system that consists of a mosaic of natural and/or human-modified ecosystems
 - characterized by physical, environmental, human, economic, institutional and cultural resources
 - involves interactions between human actions, ecosystems and the abiotic factors that shape the physical environment
 - influenced by the ecological, historical, economic and cultural processes and activities of the area
- Landscape approaches² take into consideration
 - synergies and trade-offs among the range of activities carried out to promote the sustainable intensification of agricultural production,
 - enhance adaptation to climate change,
 - reduce and/or remove greenhouse emissions, and
 - support disaster risk reduction at various scales and with many sectors and stakeholders.
- Enhancing resilience of landscapes involves
 - reducing competition for resources,
 - determining the most acceptable trade-offs,
 - minimizing negative externalities and
 - optimizing synergies

¹ Adapted from: <http://www.fao.org/3/i8324en/i8324en.pdf>;

² Adapted from: <http://www.fao.org/climate-smart-agriculture-sourcebook/concept/module-a3-landscapes/a3-overview/en/>

- Effective landscape management for delivering benefits to stakeholders requires minimizing conflicts, enhancing equity and sustaining ecosystem services³. This calls for:
 - establishing sound land-use planning and decision-making processes that are:
 - participatory,
 - consensus-building, and
 - people-centred.
 - establishing an enabling policy and governance mechanisms (including institutional framework)
 - improving communications and building public-private partnerships
 - creating incentives for sustaining ecosystem services through innovative market-based mechanisms that compensate farmers and farming communities for maintaining these services.

2. Landscape Approach: Relevance to Green-Ag Project

- The Green-Ag project is being implemented in five States: Madhya Pradesh, Mizoram, Odisha, Rajasthan and Uttarakhand
- The project landscapes are representative of different agroecological conditions with high conservation value and serve as habitats of critical biodiversity. Each landscape is unique and includes a mix of conservation and production areas. In recent times, intensive agricultural practices, development activities, and other anthropogenic pressures have negatively impacted the fragile ecosystems and resulted in the degradation of these natural habitats.
- Agriculture in these selected landscapes is largely traditional and rain-fed
- But, many farmers in these landscapes are increasingly adopting unsustainable agriculture and land use practices that are resulting in
 - loss of agrobiodiversity,
 - loss and degradation of natural habitats acting as ecological corridors between protected areas, and
 - degradation of high conservation value forests (HCVFs)⁴
- The project objective is to
 - ensure that farmers have the capacities and incentives to maintain and/or adopt ecologically friendly agriculture and land use practices
 - sustain agrobiodiversity and soil and water productivity and other ecosystem services,
 - ensure sustainability of agricultural production and improve opportunities for rural livelihoods development.
- The Green-Ag project promotes sustainable agricultural and land use management practices, which in turn would help revive these degraded landscapes and transform them into “GREEN landscapes” (GL). These “GREEN” landscapes are characterized by the

³ Ecosystem services are defined as the direct and indirect contributions of ecosystems to human wellbeing and have an impact on our survival and quality of life. There are four types of ecosystem services: provisioning, regulating, cultural and supporting services. For additional information, please look up: <https://earth.org/what-are-ecosystem-services/>

⁴ HCVFs are forests of outstanding and critical importance due to their high environmental, socio economic, biodiversity or landscape values (WWF International, 2007).

adoption of agroecological approaches for enhanced agricultural productivity, socio-economic benefits, and long-term sustainability.

- The acronym GREEN encompasses the following principles governing landscape management:
 - G—Grassroots Participatory Governance: Promote and improve effective governance and build on community managed systems at the grassroots level
 - R—Resilience: Enhance the resilience of people, communities and ecosystems
 - E—Economical and ecologically sustainable livelihoods: Enhance sustainable intensification and efficiency of resource use
 - E—Equity: Equitable access to natural resources, including by marginalized groups
 - N—Natural Resource Management: Conserve, protect, enhance sustainable use of natural resources

3. Rationale for Landscape Assessment

Broadly, the landscape assessment in the Green-Ag project seeks to:

- **Identify the different land-use types** (agriculture, mining, industry, etc.) **within the landscape**—including biodiversity rich areas as well as agrobiodiversity hotspots, community conserved areas, key watersheds and wildlife corridors, degraded areas etc.
- **Identify key stakeholders** including the indigenous peoples and their representatives, and any of their special concerns and document geographic and demographic information through participatory mapping; and their livelihoods and natural resources dependency
- **Collect the key socio-economic data** from various sources, including population structure, diversity in livelihoods, forest/agriculture dependence, livestock, energy sources, etc.
- **Study the policy environment**, which is supportive or potentially undermine project implementation, results, and replication (within and outside the state)
- **Identify strengths/challenges, opportunities and threats** to the landscape
- **Identify various institutions and platforms** (both formal and informal)—structures, mechanisms and capacities
- **Identify existing and potential value chains** for economically viable crops, breeds, with a focus on indigenous varieties and non-timber forest products (NTFPs) to enhance the incomes of small and marginal farmers in the project landscapes
- **Support development of the preliminary Green Landscape Management Plans (GLMPs)**, i.e. roadmap with shared strategies for collaborative planning, implementation and adaptive monitoring.

This will help in:

- **Landscape delineation and characterisation:** i.e. understand the landscape boundaries and its physical features. This includes understanding terrain characteristics, soils, water bodies, forest cover, land-use pattern, cropping pattern on a temporal scale, land-use and land-cover changes (LULCC), degradation (vegetation, soil and water erosion, etc.), identifying different common property resources (CPRs), habitations within the landscape, etc.

- **Understand landscape ecosystem:** understand the interdependence and interactions between different species, and interplay between different livelihoods and their impacts on landscape ecosystem. This will include assessing threats to the landscape, identifying threatened species (both flora and fauna) and potential causes adversely affecting various species and landscape in general.
- **Assess available resources:** identify the different resources available in the landscape, such as land area, forest types and area, soil types and quality, water resources, water harvesting structures, CPRs, tree species, etc. Following this, they estimate the extent and number of each of these resources, and degradation of natural resources if any.
- **Estimate demands on the landscape:** identify the different demands on the landscape. The different demands on the landscape can be broadly categorized as: population of humans, livestock, wildlife, etc. within the landscape; and livelihood activities in the landscape such as agriculture, tourism, mining, industries, etc. Assess the types and extent of resources these competing demands (populations of different species and livelihoods) require for their sustenance.
- **Assess threats to the landscape:** identify and map different types of land uses, land use practices and livelihood options which involves various sectors such as agriculture, forest, land resources, rural development etc. and impact of climate change on them . At times these sectors may be working at cross purposes, thereby posing threat to the very integrity of the landscape like fragmentation of wildlife corridors resulting into human-wildlife conflict, intensification of agriculture with greater greenhouse gas emissions, mining activities resulting into loss of virgin forest and ecosystem services, etc. The exercise will include assessing various threats to the landscape, [particularly related to biodiversity (BD), land degradation (LD), climate change (CC) and sustainable forest management (SFM)] and will inform the key stakeholders about the adverse impacts on the landscape, who can then deliberate and make informed decisions on the GLMP.
- **Estimate carrying capacity:** Estimate the landscape carrying capacity for major livelihood activities in the landscape. The methodology for assessing the landscape will be designed in consultation with domain experts and demystified for use in the field schools. Broadly, this will involve weighing the demands on the landscape (population and livelihoods) against the estimated natural resources available to support the different competing demands.
- **Determine high priority areas:** understanding of the landscape characteristics, resource availability, ecosystem integrity, risk of deforestation and degradation, and interplay between different livelihoods and their impacts on landscape ecosystem will help key stakeholders identify high priority areas and actions for project intervention.
- **Prepare GLMP and budget:** Stakeholders deliberate and debate on the demand and supply aspects of the GL, conservation measures to be undertaken to protect threatened species, strategies and actions to minimize adverse impact of various activities on the ecosystem, potential mechanisms to reduce human-wildlife conflicts to develop a realistic landscape management plan. Additionally, they will make an assessment of the resources required to implement the GLMP and ways of securing or harnessing those resources through convergence with ongoing development initiatives—government, civil society and private sector. Further, they will brainstorm the various supportive mechanisms, including incentives to motivate key stakeholder, required for implementation of the plan. The GLMP and budget will clearly assign responsibilities and timeline for implementation of the different aspects in the GLMP.

- **Develop, implement and monitor GLMP:** Stakeholders develop a monitoring plan which clearly specifies the milestones, timelines, and responsibilities to monitor the implementation of the plan, challenges in implementation, review and recognize deviations if needed, and design strategies to overcome the challenges.

4. Framework for Landscape Assessment

The Green-Ag project is funded through the GEF-6 funding cycle. The project is expected to contribute to enhancing the Global Environmental Benefits (GEBs) under four GEF Focal Areas—*Biodiversity (BD)*, *Land Degradation (LD)*, *Sustainable Forest Management (SFM)* and *Climate Change Mitigation (CCM)*. The landscape assessment will particularly focus on the following aspects of the four focal areas:

- **Biodiversity:**
 - Sustainable use of plant and animal genetic resources
 - Managing the human-biodiversity interface
- **Land Degradation:**
 - Agro-ecological intensification
 - Sustainable land management for climate-smart agriculture
 - Scaling-up sustainable land management through the landscape approach
- **Climate Change Mitigation:**
 - Promote conservation and enhancement of carbon stocks in forests and other land-uses, and support climate-smart agriculture
- **Sustainable Forest Management:**
 - Reduce the pressures on HCVMs by addressing the drivers of deforestation and forest degradation.

The framework for landscape assessment is illustrated below specifying the thematic areas, methodologies for assessment, and expected results:

Thematic Areas	Methodologies	Expected Results
Landscape characterisation	Geospatial analysis, Secondary literature review	Meteorological conditions, Land Use-Land Cover mapping, terrain characteristics, topography, soil, water, land, etc., water bodies, forest cover, biodiversity rich areas (flora and fauna); cropping pattern on temporal scale, productivity pattern, gross and net cropped area; ground water quality; consumption of chemical fertilizers, pesticides, vermi-compost, organic fertilizers, etc. Occurrence and frequency of extreme events (floods, droughts, cyclones, insect and pest attacks etc.) and their impacts on flora and fauna including threatened species, population of different species and breeds of livestock; production of milk, meat, wool etc.;
Threats to Landscape	Secondary literature review, Key Informant Interview (KII),	Land use change and drivers analysis Degradation mapping (vegetation, soil and water erosion) Biodiversity loss,

Thematic Areas	Methodologies	Expected Results
	Focus Group Discussions (FGDs)	Landscape carrying capacity assessment Develop a threat reduction index for BD, LD, CCM and SFM
Stakeholder analysis	Secondary literature review, KII, FGDs	Stakeholder mapping, interests, common interests and conflicts, Stakeholder platforms, Livelihoods; and Natural resource use
Socio-economic assessment	Secondary literature review, KII, FGDs, Household surveys	Gender [#] , age group, ethnicity/caste, female headed households, marital status, education, health infrastructure, road and electricity coverage and access of drinking water, cooking gas; infant mortality rate, maternal mortality rate; livelihoods and professions; current livelihoods & interplay of different livelihoods; urbanization and rural migration; income & expenditure, assets, land tenure and access, land holding pattern; State GDP, Per capita income; Industrial units and workers mainly the agriculture, forest, livestock and fisheries dependent
Institutional assessment	Secondary literature review, KII and FGDs	Institutions, local communities, and households Institutional mechanisms: institutions and platforms (both formal and informal)—structures, mechanisms and capacities, Governance structures & community institutions (roles & responsibilities);
Policy Environment	Secondary literature review, KII	Policy environment relevant (agriculture, animal husbandry, forestry, fishery etc.) sectoral policies and programs
Supply and Value chain analysis	Secondary literature review, KII and FGDs	Viable commodities with an emphasis on indigenous crops / livestock breed /Non-Timber Forest Produce (NTFP) species etc. (from inputs to markets), Intervention areas and strategies including a detailed cost benefit analysis

For further details on gender aspect in the project, please refer to the Gender strategy paper.

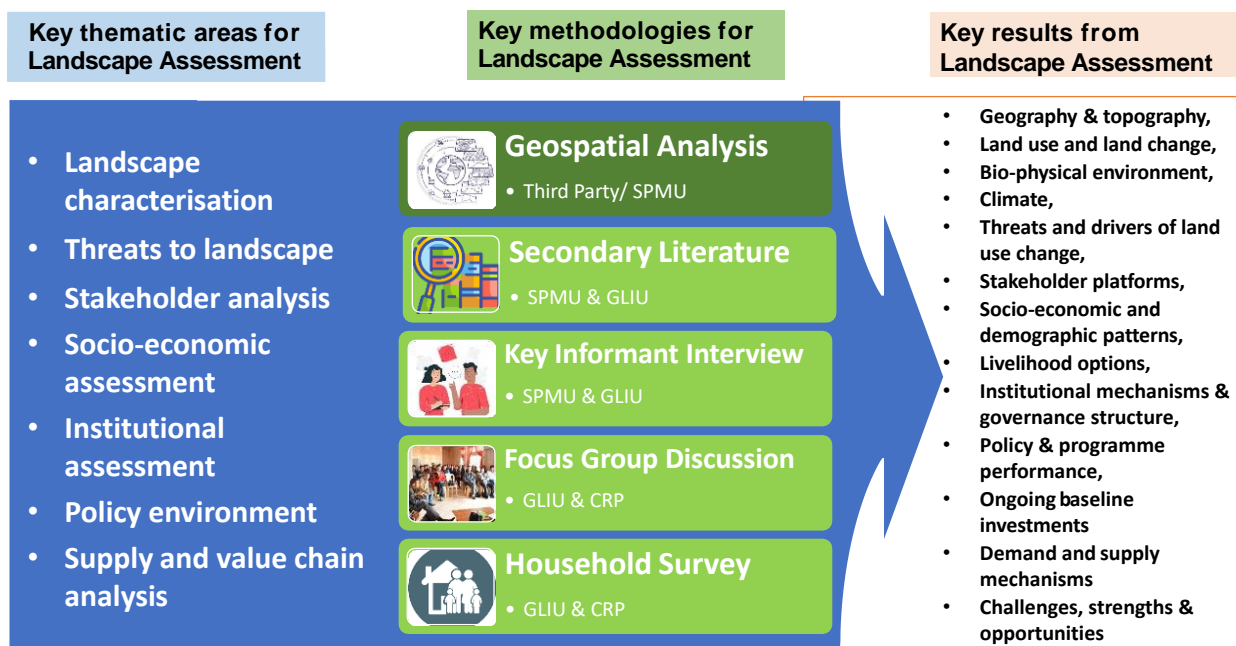


Figure 1: Landscape Assessment Framework

5. Methods for undertaking Landscape Assessment

a) Geospatial analysis

Geospatial analysis includes use of remote sensing technology and Geographical Information System (GIS) to generate temporal data on meteorological conditions, land cover and land use change, terrain characteristics, water bodies, forest cover, cropping patterns, population density, etc. within a geographical area. As part of landscape assessment, following data and information will be collected and analysed using geospatial technology:

S. No.	Information required	Data sources
1	Administrative Boundaries (Villages and Village Boundaries)	<ul style="list-style-type: none"> • Geospatial mapping-initial report • Ground truthing • Final report
2	Protected Area Boundary	
3	Human Population Density	
4	Terrain Characteristics	
5	Land Use / Land Cover	
6	Forest cover map (temporal changes)	
7	River Network and Stream Order	
8	Delineation of Watersheds	
9	Forest Degradation, Water Erosion, Flood Risk Zones, Fire Vulnerability, Moisture Stress	
10	Meteorological conditions	
11	Road Network	

b) Secondary literature review

Secondary literature review will include a thorough/critical analysis of the reports and statistics published by the Government Departments, at National and State level. The data published by other authentic agencies may also be used. The data to be collected through secondary literature review is presented in the following tables.

Table 1: Agriculture related information

S. No.	Information required	Data sources (Indicative list)
1	Policy	
1.1	Existing National and State policies with agroecological considerations	Policy: <ul style="list-style-type: none"> • National Agricultural Policy, • National Policy for Farmers, • National Policy for Management of Crop Residue Burning, National Water Policy, • National Agroforestry Policy, • National Seed Policy, • Organic farming policy enacted by various states in India <i>(Note: The State team or the external agency/consultant will identify the State specific relevant policies)</i>
1.2	Specific clauses promoting agroecological approaches	
1.3	Gaps that impede promotion of agroecological approaches in the identified policies	
1.4	Specific measures/ ways in which agroecological approaches can be promoted in the identified policies	
1.5	Policies (identified above) with considerations for concerns of women and marginalized groups	
1.6	Policies (identified above) promoting integration of indigenous traditional knowledge	
1.7	Policies (identified above) promoting traditional crop varieties	
2	Programmes & Schemes	
2.1	Mapping of existing National and State level programmes and schemes with a focus on either of the following areas: <ul style="list-style-type: none"> • Agroecological approaches • Natural resource management and sustainable land use practices • Sustainable agriculture practices • Biodiversity management practices • Agrobiodiversity conservation measures • Agrobiodiversity indicators <i>Note: A list of above-mentioned practices and indicators in relevant programmes and schemes to be prepared</i>	Programmes & Schemes: <ul style="list-style-type: none"> • National Mission for Sustainable Agriculture (NMSA), • Pradhan Mantri Krishi Sinchayee Yojana- Per Drop More Crop (PMKSY-PDMC), • National Food Security Mission (NFSM), • Mission for Integrated Development of Horticulture (MIDH), • Crop Diversification Programme (CDP), • Sub-Mission on Agroforestry (SMAF), • National Bamboo Mission (NBM), • Paramparagat Krishi Vikas Yojana (PKVY), • Mission Organic Value Chain Development for North Eastern Region (MOVCDNER), • Soil Health Card (SHC), Sub-Mission on Agricultural Mechanization (SMAM), • Integrated Pest Management (IPM), • National Beekeeping & Honey Mission
2.2	Monitoring/ tracking of above listed management practices, indicators	

S. No.	Information required	Data sources (Indicative list)
2.3	Frequency of monitoring	Literature review will include: <ul style="list-style-type: none"> • Programme & Schemes guidelines • Progress monitoring through website • Impact assessment report <i>(Note: The State team or the external agency/consultant will identify the State specific relevant programmes and schemes)</i>
2.4	Potential programmes and schemes that have a scope for integrating agrobiodiversity indicators	
2.5	(a) Major challenges in implementation of biodiversity related management practices (b) Suggestions for overcoming these challenges.	
2.6	List assistance in terms of input, insurance, credit, irrigation, market, training etc. being provided in these programmes and schemes for both traditional and modern crops.	
2.7	Budgetary details (Allocation, utilization)	
2.8	Provision in budget for women and marginalised communities	
2.9	Reasons for low utilization of budget (if any) and suggestions for improvement	
3	Agricultural crops and varieties	
3.1	Globally significant major crop plants*: Latest State-wise/ district-wise details on following: <ul style="list-style-type: none"> • Area in hectares (current and 10 or 15 years back), • Scientific name, • local name, • number of varieties, • varietal name 	<ul style="list-style-type: none"> • District Gazetteer, • People's Biodiversity Register, • Compendium of Varieties Registered under PPV&FRA, • Compendium of Farmers Varieties Registered under PPV&FRA, • Agrobiodiversity Hotspots in India-PPV&FRA, • Gene bank dashboard of NBPGR. • Research papers of local universities /Research institutes on loss of local agro-biodiversity
4	Cropping Area	
4.1	Net sown Area (ha)	<ul style="list-style-type: none"> • Agriculture contingency plans for district, • State Agriculture Statistics, • State Economics Statistics report
4.2	Gross cropped Area (ha)	
4.3	Area (ha) under intercropping, relay cropping, etc.	
5	Management practices	
5.1	Current management practices for grassland and ravine	State Agriculture Department reports <i>(Note: Information will be validated at community level either through FGD, household survey/KII with practitioners)</i>
5.2	Current management practices for pastoral management	
5.3	Current management practices for improving vegetative cover	

Table 2: Livestock^{##} related information

S.No.	Information required	Data sources (Indicative list)
1	Policy	
1.1	Existing National and State policies with agroecological considerations specific to livestock sector	<p>Policy: National Livestock Policy</p> <p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant policies)</i></p>
1.2	Specific clauses promoting agroecological approaches	
1.3	Gaps that impede promotion of agroecological approaches in the select set of policies	
1.4	Specific measures/ ways in which agroecological approaches can be promoted in the identified policies	
1.5	Policies (identified above) with considerations for concerns of women and marginalized groups	
1.6	Policies (identified above) promoting integration of indigenous traditional knowledge	
1.7	Policies (identified above) promoting traditional crop varieties and local animal breeds	
2	Programmes & Schemes	
2.1	<p>Existing National and State level programmes and schemes with following:</p> <ul style="list-style-type: none"> • Agroecological approaches • Natural resource management and sustainable land use practices • Management practices that promote sustainability and biodiversity in livestock • Biodiversity management practices • Agrobiodiversity conservation measures (focus on livestock) • Agrobiodiversity indicators (focus on livestock) <p><i>Note: A list of above-mentioned practices and indicators in relevant programmes and schemes to be prepared</i></p>	<p>Programmes & Schemes:</p> <ul style="list-style-type: none"> • National Livestock Mission, • Programme on Livestock Health and Disease Control Programme, • Rashtriya Gokul Mission, • National Programme for Dairy Development, Supporting Dairy Cooperatives and Farmer Producer Organizations engaged in dairy activities, • Pradhan Mantri Matsya Sampda Yojna, • Blue Revolution Programme , • Breeding Policies, • Breeding Implementation Architecture <p>Literature review will include:</p> <ul style="list-style-type: none"> • Programme & Schemes guidelines • Progress monitoring through website • Impact assessment report <p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant programmes and schemes)</i></p>
2.2	Monitoring/ tracking of above listed management practices, indicators	
2.3	Frequency of monitoring	
2.4	Potential programmes and schemes that have a scope for integrating	

S.No.	Information required	Data sources (Indicative list)
	agrobiodiversity indicators (focus on livestock)	
2.5	(a) Major challenges in implementation of biodiversity related management practices (b) Suggestions for overcoming these challenges.	
2.6	List assistance in terms of input, insurance, credit, irrigation, market, training etc. being provided in these programmes and schemes for both traditional and modern crops and traditional, crossbred and purebred breeds	
2.7	Budgetary details (Allocation, utilization)	
2.8	Provision in budget for women and marginalised communities	
2.9	Reasons for low utilization of budget (if any) and suggestions for improvement	
3	Livestock breeds and area coverage	
3.1	Globally significant major livestock breeds*: Latest and 10/15 years back State-wise/ district-wise details on following: <ul style="list-style-type: none"> Numbers, Scientific name, local name etc. 	<ul style="list-style-type: none"> Livestock census, State economic survey
3.2	Unit Area of livestock (household herd size and household land holding)	
4	Traditional breeds	
4.1	List of Identified traditional breeds of the State	<ul style="list-style-type: none"> Website of National Bureau of Animal Genetic Resources (NBAGR), Livestock census
4.2	Population of identified traditional breeds of the State in the landscape	

For further details on livestock, please refer to the strategy paper on livestock.

Table 3: Forests/ forestry related information

S.No.	Information required	Data sources (Indicative list)
1	Programmes & Schemes	
1.1	Existing National /State level programmes and schemes relevant to NRM and sustainable land use practices.	Programmes & Schemes: <ul style="list-style-type: none"> Compensatory Afforestation Funds (CAFs), Green India Mission (GIM), National Afforestation Programme, Forest Fire Prevention Management Scheme,
1.2	Budgetary details (Allocation, utilization)	
1.3	Provision in budget for women and marginalised communities	

S.No.	Information required	Data sources (Indicative list)
1.4	Reasons for low utilization of budget (if any) and suggestions for improvement	<ul style="list-style-type: none"> National Afforestation Programme, Integrated Development of Wildlife Habitat, Project Tiger <p>Literature review will include:</p> <ul style="list-style-type: none"> Programme & Schemes guidelines Progress monitoring through website Impact assessment report <p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant programmes and schemes)</i></p>
2	Forest Areas	
2.1	Type and extent of forest in Protected Areas	<ul style="list-style-type: none"> Records of Forest department, Forest Survey of India reports, Protected Area Management Plan
2.2	Threats and strategy for forest management	
2.3	Extent of HCVFs in landscape	<ul style="list-style-type: none"> District Gazetteer, Four Year Census (WII), Records of Forest department/ Forest working plans, Forest Survey of India reports, Tiger Census (NTCA), Biennial Census Reports of terrestrial protected areas, Annual population estimation reports of Chambal Wildlife sanctuary
3	Management practices	
3.1	Current management practices for grassland and ravine	<ul style="list-style-type: none"> Forest Survey of India Report, Forest working plans, Management Plans of Protected Areas <p><i>(Note: Information will be validated at community level either through FGD, household survey/KII with practitioners)</i></p>
3.2	Current management practices for pastoral management	

Table 4: Land and water related information

S. No.	Information required	Data sources (Indicative list)
1	Programmes & Schemes	
1.1	Existing National /State level programmes and schemes relevant to NRM and sustainable land use practices.	<p>Programmes & Schemes:</p> <ul style="list-style-type: none"> Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Pradhan Mantri Krishi Sinchayee Yojana- Integrated Watershed Management Programme (IWMP), National Rural Livelihood Mission (NRLM) <p>Literature review will include:</p>
1.2	Budgetary details (Allocation, utilization)	
1.3	Provision in budget for women and marginalised communities	
1.4	Reasons for low utilization of budget (if any) and suggestions for improvement	

S. No.	Information required	Data sources (Indicative list)
		<ul style="list-style-type: none"> • Programme & Schemes guidelines • Progress monitoring through website • Impact assessment report <p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant programmes and schemes)</i></p>
2	Forest Areas	
2.1	Type and extent of forest in and outside Protected Areas	<ul style="list-style-type: none"> • District Gazetteer, • District Land record
2.2	Threats and strategy for forest management	<ul style="list-style-type: none"> • Forest Survey of India Reports
3	Management practices	
3.1	Current management practices for grassland and ravine	<ul style="list-style-type: none"> • Wasteland Atlas of India • State Rural Department Reports
3.2	Current management practices for pastoral management	<p><i>(Note: Information will be validated at community level either through FGD, household survey/KII with practitioners.)</i></p>
4	Irrigation	
4.1	Irrigation sources	<ul style="list-style-type: none"> • National Water policy, • Ground water policy, • District irrigation plans
4.2	Irrigation potential created	
4.3	Irrigation potential utilized	<p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant programmes and schemes)</i></p>

Table 5: Socio-economic information

S. No.	Information required	Data sources (Indicative list)
1	<ul style="list-style-type: none"> • Gender • age group • ethnicity/caste • female headed households • marital status • education • health infrastructure • road and electricity coverage • access of drinking water • cooking gas • diversity in livelihoods and professions • current livelihoods & interplay of different livelihoods 	<ul style="list-style-type: none"> • Population Census, • Agriculture Census, • Economic Census, • Official reports from Ministry of Rural Development, • Ministry of Tribal Affairs, and • Ministry of Women and Child Development • Reports on Rural employment published by Government of India (GoI), • Statistical Abstracts by Directorate of Economics and Statistics, • District Gazetteer <p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant reports)</i></p>

S. No.	Information required	Data sources (Indicative list)
	<ul style="list-style-type: none"> urbanization and rural migration income & expenditure, assets, land tenure and access, including population structure, dependence on forest/agriculture dependence, livestock, energy sources etc. State GDP and per capita income Industrial units and workers mainly the agriculture, forest, livestock and fisheries dependent <p><i>(Indicative list)</i></p>	

Table 6: Institution related information

S. No.	Information required	Data sources (indicative list)
1	Institutions and platforms (both formal and informal)—structures, mechanisms and capacities etc.	<ul style="list-style-type: none"> List of registered FPOs from Department of corporate affairs Self-help groups from Ministry of Rural Development
2	Identification of community institutions and their nature of work on NRM and spatial planning at the local level- Mandate, representation (women and other marginalised communities), effectiveness of the performance, ways of strengthening their ongoing work.	<ul style="list-style-type: none"> NGOs registered under the Society Act (State government) Directorate of Economics and Statistics State's Socio-Economic Reviews Annual reports of Department of Agriculture Agriculture Statistics of State Agriculture Department District Potential Link Plans of NABARD State Forest Statistics State Biodiversity Board State Rural Development Department Reserve Bank's Data Warehouse

c) Key Informant Interviews

Key informant interviews will be undertaken with officers from government departments, community leaders, village secretary, sarpanch (village head), village-level government functionaries etc. These key informants will be interviewed to validate findings of the secondary literature review along with capturing their views and response on selected topics. The information to be captured through key informant interview is presented in the following tables.

Table 7: Agriculture department

S. No.	Information required	Key Informant
1	Validation of following: <ul style="list-style-type: none"> • inclusion of agroecological clauses/components in National and State specific policies and programmes • gaps that impede promotion of agroecological approaches in the select policies • specific measures/ ways in which agroecological approaches can be promoted • concerns of women and marginalized groups addressed in the identified policies 	<ul style="list-style-type: none"> • Director and Joint Directors of State Agriculture Department running the relevant programmes and schemes
1.1	Views on the following: <ul style="list-style-type: none"> • Any future plans to include agroecological considerations in State specific sector policies 	
2	Validation of following financial details: <ul style="list-style-type: none"> • Allocation • Utilization • Reasons for low utilization (if any) • Percentage allocation for women farmers • Percentage of allocation for marginalized communities • Percentage of utilization Reasons for low utilization, if any	
2.1	Information on: percentage of financial resources for convergence (if any) in these programmes and schemes	
3	Validation of following information: <ul style="list-style-type: none"> • Management practices promoting biodiversity in relevant National and State level programmes and schemes • Major challenges in implementation of these management practices • Women friendly practices from those identified above 	
3.1	Suggestions to overcome the challenges in para 3 above	
3.2	Response/views on the following: <ul style="list-style-type: none"> • Are the women friendly practices listed in Para 3 resulting in increased drudgery? • Ways to off-set the increased drudgery among women • Role of women in decision making 	
4	Validation of following information:	

S. No.	Information required	Key Informant
	<ul style="list-style-type: none"> • Mandate of Community institutions working on NRM and spatial planning • Representation (women and other marginalized communities) • Effectiveness of the performance of the institutions • Ways of strengthening ongoing work 	
5	Validation on <ul style="list-style-type: none"> • Crop Name • Variety Name (being promoted in the district/project landscape)	<ul style="list-style-type: none"> • Agriculture Extension officer, • community leaders, • village level government functionaries
5.1	Information on following: <ul style="list-style-type: none"> • Type of variety, Traditional or modern • Seed source • Certified seeds • Market demand 	

Table 8: Animal husbandry department

S.No.	Information required	Key Informant
1	Validation of following: <ul style="list-style-type: none"> • inclusion of agroecological clauses/components in National and State specific policies and programmes • gaps that impede promotion of agroecological approaches in the select policies • specific measures/ ways in which agroecological approaches can be promoted • concerns of women and marginalized groups addressed in the identified policies 	<ul style="list-style-type: none"> • Director and Joint Directors of State Animal husbandry Department, running the relevant programmes and schemes
2	Views on the following: <ul style="list-style-type: none"> • Any future plans to include agroecological considerations in State specific sector policies 	
3	Validation of following information: <ul style="list-style-type: none"> • Management practices promoting biodiversity in relevant National and State level programmes and schemes • Major challenges in implementation of these management practices • Women friendly practices from those identified above 	

S.No.	Information required	Key Informant
3.1	Suggestions to overcome the challenges in para 3 above	
3.2	Response/views on the following: <ul style="list-style-type: none"> • Are the women friendly practices listed in Para 3 resulting in increased drudgery? • Ways to off-set the increased drudgery among women • Role of women in decision making 	
4	Validation of following information: <ul style="list-style-type: none"> • Mandate of Community institutions working on NRM and spatial planning • Representation (women and other marginalized communities) • Effectiveness of the performance of the institutions • Ways of strengthening ongoing work 	

Table 9: Forest department

S.No.	Information required	Key Informants
1	Validation of following: <ul style="list-style-type: none"> • Allocation • Utilization • Reasons for low utilization (if any) • Percentage allocation for women farmers • Percentage of allocation for marginalized communities • Percentage of utilization • Reasons for low utilization, if any 	<ul style="list-style-type: none"> • Chief Conservator of Forests- State Forest Department, running the relevant programmes and schemes
1.1	Information on: <ul style="list-style-type: none"> • percentage of financial resources for convergence (if any) in these programmes and schemes 	

Table 10: Rural department or department of land resources

S. No.	Information required	Key Informants
1	Validation of following: <ul style="list-style-type: none"> • Allocation • Utilization • Reasons for low utilization (if any) • Percentage allocation for women farmers • Percentage of allocation for marginalized communities • Percentage of utilization 	<ul style="list-style-type: none"> • Director and Joint Directors Soil & water conservation Department, • Director and Joint Directors Department of land Resources

S. No.	Information required	Key Informants
	<ul style="list-style-type: none"> Reasons for low utilization, if any 	
1.1	Information on: <ul style="list-style-type: none"> percentage of financial resources for convergence (if any) in these programmes and schemes 	
2	Validation of following information: <ul style="list-style-type: none"> Mandate of Community institutions working on NRM and spatial planning Representation (women and other marginalized communities) Effectiveness of the performance of the institutions Ways of strengthening ongoing work 	

d) Focus Group Discussion

Focus group discussion will be undertaken with group of people having similar experiences to discuss specific topics. The topics for the focus group discussion is presented in the table below.

Table 11: Focus Group Discussion

S. No.	Information required	Source
1	Sustainable agricultural/ livestock management practices adopted by farmers, traditional and indigenous agricultural practices	<ul style="list-style-type: none"> Lead farmers, Livestock keepers, Farmers interest group, Farmer Producer Organizations (FPOs), Self Help Groups (SHGs), Watershed management committees, Joint Forest Management Committees (JFMCs), Eco-Development Committee (EDCs), Biodiversity Management Committees (BMCs), Youth clubs, Farmer clubs, Committee Development Group, Village forest development committees, Cooperative societies, Voluntary organization, Women association, Local NGOs
2	Major crops cultivated (Area, indigenous or modern variety)	
3	Access to input: Seed supply, plantation material, fertilizers, agriculture equipment, irrigation facilities, access to credit	
4	Post- harvest management	
5	Access to inputs, market, insurance etc.	
6	Major animal breeds reared (Number, indigenous or hybrid)	
7	Management practices for grassland and ravine	
8	Management practices for pastoral management	
9	Role of women in decision making and other agricultural activities	

e) Household/ Practitioner Survey

Household survey will be undertaken as part of landscape assessment to collect individual level data. The information will be collected on agronomic practices, environmental aspects, social interactions, economic aspects and governance as detailed in the table below:

Table 12: Household/ Practitioner Survey

S.No.	Information required	Source
	<p>a) Agronomic Practices</p> <ul style="list-style-type: none"> • Agricultural production activities (crop production, livestock production, agroforestry, aquaculture, bee keeping, fishing etc.) • Pest management practices • Animal breeding practices • Animal nutrition and health • Utilisation of Indigenous varieties and breeds • Agroecological and sustainable agricultural practices <p>b) Environmental Aspects</p> <ul style="list-style-type: none"> • Land Access • Weed species and management • Land management practices • Water access, management practices and techniques, water quality • Soil Quality and Land Degradation • Energy Sources • Extreme Weather Events <p>c) Social Interactions</p> <ul style="list-style-type: none"> • Community cooperation • Group membership • Nutrition • Decision-making (Household) • Decision-making (Farm management) <p>d) Economic Aspects</p> <ul style="list-style-type: none"> • Farm Income Generating Activities • Non-farm Income Generating Activities (IGAs) – paid labour, firewood collection/selling, selling handicrafts, Govt transfers (social protection cash transfers) • Farm inputs • Information and Communication Technologies • Access to Markets 	<ul style="list-style-type: none"> • Selected individuals/ households

S.No.	Information required	Source
	<ul style="list-style-type: none"> • Income sources, expenditures and savings • Major productive assets • Access to financial services and insurance <p>e) Governance Awareness on Government policies and programmes on climate change, sustainable agriculture and forest management</p>	

f) Value Chain analysis

A comprehensive market assessment and value chain analysis will be undertaken in the project landscapes. The analysis would shed light on the status and economic viability of existing value chains and potential value chains of sustainably produced agriculture, livestock and NTFPs, and determine which ones hold promise of climate-resilient livelihood opportunities, product expansion, market viability, value addition opportunities, quality improvement and input availability to the producers. One of the focus areas of value chain analysis will be assessing the market competitiveness of potential indigenous crops/livestock varieties. The methodology for value chain analysis will include secondary literature analysis, key informant interview, focus group discussion.

Table 12: Secondary literature review for value chain analysis

S. No.	Information required	Data Source for secondary literature review (indicative list)
1	Area under agriculture Area under NTFP produce, Livestock data, Agriculture production	<ul style="list-style-type: none"> • District Gazetteer, • Agriculture Contingency plans for District, • State Agriculture Statistics, • Handbook on Horticulture Statistics, • People’s Biodiversity Register (PBR), • State Economics Statistics report, • Livestock census, • Annual reports- National Rural Livelihood Mission/ State Rural Livelihood Mission <p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant programs and schemes)</i></p>
2	Agricultural marketing structure	<ul style="list-style-type: none"> • Integrated Scheme on Agricultural Marketing- Agricultural Marketing Infrastructure, • Reports from Small Farmers’ Agribusiness Consortium (SFAC), • State Marketing programs <p><i>(Note: The State team or the external agency/consultant will identify the State specific relevant programs and schemes)</i></p>

Table 13: Key informant interview for value chain analysis

S. No.	Information needed	Key Informants
1	Validation of following information: Area under agriculture Area under NTFP produce, Livestock data, Agriculture production	<ul style="list-style-type: none"> • Director & Joint Directors of State Agriculture Department, • Director & Joint Directors of State Horticulture Department, • Director & Joint Directors of State Animal Husbandry Department, • Director & Joint Directors of State Rural Department
2	Agricultural marketing structure	<ul style="list-style-type: none"> • Officer of APMC • Regulated Market Committee • Organizer of Local <i>Haats</i> (Markets) • Other market players engaged in procurement and trading

Table 14: Focus group discussion for value chain analysis

S. No.	Information required	Source
1	Major crops cultivated (Area, indigenous or modern variety)	<ul style="list-style-type: none"> • Lead farmers, • Livestock keepers, • Farmers interest group, • FPOs, • SHGs, • Watershed management committees, • JFMCs, • EDCs, • BMCs, • Youth clubs, • Farmer clubs, • Committee Development Group, • Village forest development committees, • Cooperative societies, • Voluntary organization, • Women association, • Local NGOs
2	Access to input: Seed supply, plantation material, fertilizers, agriculture equipment, irrigation facilities, access to credit	
3	Post- harvest management	
4	Access to inputs, market, insurance etc.	
5	Major animal breeds reared (Number, indigenous or hybrid)	
6	Role of women in decision making and other agricultural activities	

6. Analysis & Findings

Framework for analysis will be based on the thematic areas as mentioned in the framework for landscape assessment. The broad categories for analysis are as follows.

- **Status and Potential of Global Environmental Benefits (under BD, LD, CCM, SFM)**
 - Biodiversity (BD)- The goal of the biodiversity focal area is to assess and maintain globally significant biodiversity and the ecosystem goods and services that it provides to society. This will be achieved in the following ways.
 - (a) Assessing and enhancing genetic diversity of globally significant cultivated plants and domesticated animals that are sustainably used within production systems
 - (b) Assessing and increasing area of production landscapes that integrate conservation and sustainable use of biodiversity into management
 - (c) Analysing sector policies and regulatory frameworks incorporated biodiversity considerations
 - Land Degradation (LD)- The land degradation focal area embraces the landscape approach to promoting integrated natural resources management. The focal area drives an agenda for multiple global environmental benefits, including those related to the protection and sustainable use of biodiversity, climate change mitigation and adaptation. The goals of reducing land degradation will be realised through the following ways.
 - (a) Improved agricultural, rangeland and pastoral management
 - (b) Functionality and cover of agro-ecosystems maintained

- (c) Increased investments in sustainable land management
 - (d) Support mechanism for sustainable land management in wider landscapes established
 - (e) Integrated landscape management practices adopted by local communities based on gender sensitive needs
 - (f) Increased investments in integrated land management
- Climate Change Mitigation (CCM)- The climate change mitigation strategy is to seek synergistic opportunities to make transformational shifts towards a low emission development path. In the project's context, it will be met by accelerated adoption of innovative technologies and management practices for Green House Gas (GHG) emission reduction and carbon sequestration.
- Sustainable Forest Management (SFM)- The sustainable forest management strategy advocates an integrated approach at the landscape level, embracing ecosystem principles and including livelihood objectives in the management of forest ecosystems. This will be achieved in following ways.
 - (a) Cross-sector policy and planning approaches at appropriate governance scales, avoid loss of high conservation value forests
 - (b) Innovative mechanisms avoid the loss of high conservation value forest
- **Socio-economic assessment-** This project will use agriculture as the primary entry point to promote a multi-sectoral approach to enhance positive environmental services while mitigating negative environmental impacts, without compromising productivity and socioeconomic benefits. Socio-economic assessment will collect field level data on the agricultural practices; land use; crops under cultivation; use of natural resources; income, farm expenditure, livelihood details; access to market, credit facility, agricultural inputs; the role of women in agriculture and decision making; livestock management; forest dependence etc.
- **Institutional assessment-** One of the fundamental aspects of the project's design is to positively affect institutions at national, state, district, and local levels. Institutional assessment will include mapping of relevant institutes whose mandate/ objectives are aligned to the project objectives, assessing their human resources for technical and functional capacities, financial viability, etc.
- **Value chain analysis-** The value chain analysis will cover agriculture and allied sectors (agro-products, dairy, livestock, timber (sourced from agroforestry), NTFPs (including bamboo etc.), wherever such scope exists in any landscapes of the project. Through this analysis, the project will map a list of viable commodities with emphasis on indigenous crops/ livestock breed/NTFP species etc. having a good market potential in the landscape. This will eventually help in "greening" the existing value chains and promoting alternative value chains.

7. Budget

- **Geospatial analysis-** The expenditure incurred for geospatial analysis in Madhya Pradesh and Uttarakhand should be charged to the GEF budget line "5650 Contracts" under the cost description (budgetary sub-head) "Social/Gender, BD & Capacity Assessment to identify High Priority Areas". The expenditure incurred for geospatial analysis in three project landscapes,

Mizoram, Odisha and Rajasthan is mobilized through FAO Internal resources (FAO core funding).

- **Secondary literature review-** The expenditure incurred towards payment of consultant for carrying out secondary literature review in four landscapes of Odisha, Rajasthan, Madhya Pradesh and Uttarakhand should be charged to GEF budget line “5570 Consultants”. The expenditure incurred for secondary literature review in Mizoram should be charged to FAO Internal resources (FAO core funding).
- **Key Informant Interview, Focus Group Discussion and Household survey-** The expenditure incurred for key informant interview including cost of moderator training, tools should be charged to the GEF budget line “5650 Contracts” under the cost description (budgetary sub-head) “Social/Gender, BD & Capacity Assessment to identify High Priority Areas”. Additionally, the expenditure for designing and printing of communication products such as pamphlets, brochure, leaflets etc. should be charged to “5650 Contracts” under the cost description (budgetary sub-head) “Design and Printing of publications & awareness materials”.
- **Value Chain Analysis-** The expenditure towards value chain analysis should be charged to GEF budget line “5650 Contracts” under the cost description (budgetary sub-head) “Studies on Green Value Chains or “Social/Gender, BD & Capacity Assessment to identify High Priority Areas”. The expenditure incurred for value chain analysis in Mizoram should be charged to FAO Internal resources (FAO core funding).

8. Monitoring Plan

The landscape assessment activity is implemented under the **Project Component 2 “Empowering and incentivizing households and communities to adopt agroecological practices across landscapes”**. This will contribute towards realization of **Output 2.1.4 Green Landscape Assessment reports/ findings available with social, economic, institutional, biophysical aspects of target areas** and Activity 2.1.4.1 Social and BD Assessment to identify High Priority Areas. Result Indicators that will be used to monitor the progress on landscape assessment against the set targets, are as follows.

S. No.	Output /Activity	Result Indicator	Target
1	2.1.4. Green Landscape Assessment reports/ findings available with social, economic, institutional, biophysical aspects of target areas	2.1.4-I1 Number of Assessment reports	5
2	2.1.4.1 Social and BD Assessment to identify High Priority Areas – (MP, Mz, Od, Rj, & Uk)	2.1.4.1-I1 Number of Social and BD Assessment reports on project landscapes	5 (1/Landscape)

A monitoring framework with indicators to track the progress of under various methodologies used in process of landscape assessment (as per the landscape assessment framework) is presented below. The progress against these indicators will help in realization of the Results indicators 2.1.4.1-I1 Number of Social and BD Assessment reports on project landscapes.

S. No.	Methodologies	Monitoring indicators
1	Geospatial analysis	<ul style="list-style-type: none"> a. Contracts issued to external agency for geospatial analysis in Odisha, Rajasthan, Mizoram. b. Inception report including work plan and methodology c. Ground truthing plan d. Preliminary data analysis report e. Full draft report f. Final report addressing feedback and recommendations
2	Secondary literature review	<ul style="list-style-type: none"> a. ToR for hiring of consultant in all project landscapes. b. Contract issued to consultant c. Annotated outline d. Research methodology and framework e. Full draft report f. Final report addressing feedback and recommendations
3	Key Informant Interview	<ul style="list-style-type: none"> a. Tools (questionnaire, response sheet) for Key Informant Interview- Draft developed b. Guiding documents- Draft developed c. Communication products- Draft developed d. Final tools, guiding document, communication products developed e. Training report and list of participants trained from SPMU and GLIU f. Feedback on Pre-testing of tools g. Analysis report/ Response sheet for Key informant interview
4	Focus Group Discussion	<ul style="list-style-type: none"> a. Tools (topics for discussion, response sheet etc.) for Focus Group Discussion-Draft developed b. Guiding documents- Draft developed c. Communication products- Draft developed d. Final tools, guiding document, communication products developed e. Training report and list of participants trained from SPMU and GLIU f. Feedback on Pre-testing of tools g. Analysis report/ Response sheet Focus group discussion
5	Household/practitioner's survey	<ul style="list-style-type: none"> a. Tools (survey questionnaire, response sheet etc.) for survey- Draft developed b. Guiding documents- Draft developed c. Communication products- Draft developed d. Final tools, guiding document, communication products developed e. Training report and list of participants trained from SPMU and GLIU f. Feedback on Pre-testing of tools g. Analysis report/ Response sheet for household/ practitioner's survey