# Pathway to Landscape Based Village Development Planning in CREFLAT

Indo-German Development Cooperation

Climate Change Adaptation Programme in the Himalaya, Component II: Tripura – Climate Resilience of Forest Ecosystems, Biodiversity & Adaptive Capacities of Forest Dependent Communities (CREFLAT)

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# Acronyms

| | |
|---|---|
| ADC | Autonomous Development Council |
| CREFLAT | Climate Resilience of Forest Eco-systems, Biodiversity and Adaptive Capacities of Forest Dependent Communities in Tripura |
| DEM | Digital Elevation Model |
| FPIC | Free Prior Informed Consent |
| GoT | Government of Tripura |
| HDI | Human Development Index |
| HH | Household |
| IGDCP | Indo German Development Cooperation Project |
| JFMC | Joint Forest Management Committee |
| KfW | Kreditanstalt für Wiederaufbau |
| MGNREGA | Mahatma Gandhi National Rural Employment Guarantee Act |
| PAR | Participatory Action Research |
| PHC | Public Health Centres |
| PKKKY | Praktrik Kheti Khusal Kisan Yojana (Natural Farming Programme) |
| PMC | Project Management Consultant |
| PMGSY | Prime Minister’s Village Road Programme |
| PRA | Participatory Rural Appraisal |
| SA | Separate Agreement |
| SCATFORM | Sustainable Catchment Forest Management in Tripura |
| SDG | Sustainable Development Goals |
| ST | Schedule Tribe |
| VDP | Village Development Plan |
| VDPIC | Village Development Planning and Implementation Committee |
| WUC | Water User Committee |

# 1 Introduction

Landscape approaches to integrated land management have been gaining considerable attention in scientific literature as well as in international policy and practice of natural resource development and its management. The approach is gaining increasing support at governmental and intergovernmental levels, as well as being embraced by a host of international research and development agencies (Reed et al., 2017). The review of several such approaches has shown that landscape approaches are potential as a framework to reconcile conservation and development and improve social capital, enhance community income and employment opportunities as well as reduce land degradation and conserve natural resources. The key contributing factors towards implementation, and progress, of landscape approaches suggest that multi-level, or polycentric, governance structures relate well with intervention success. In the context of the "Climate Resilience of Forest Eco-systems, Biodiversity and Adaptive Capacities of Forest Dependent Communities in Tripura"(CREFLAT) Project, it needs to be considered that landscapes are known to be vital for sustainable and equitable development, in which customized investments can be made through participatory approaches based on VDPs. International development policy dialogues such as the operational SDGs (SDG 15 Life on Land) as well as the outcomes of the Paris Agreement (2015) have highlighted the need for sustainable landscapes to be recognized as a source of multiple social, economic, and environmental benefits. Taking the above views, for practical purposes definition of a landscape is given below:

> *A landscape is defined as a "socio-ecological system that consists of natural and/or human modified eco-systems, and which is influenced by distinct ecological, historical, political, economic and cultural processes and activities (Denier et al. 2015, P 26)."*

Figure 1 shows a schematic image of landscapes showing multiple socio-ecological systems intertwined with networks that are represented by numerous actors and sectors rooted in the place at scale whilst cutting across traditional administrative boundaries.

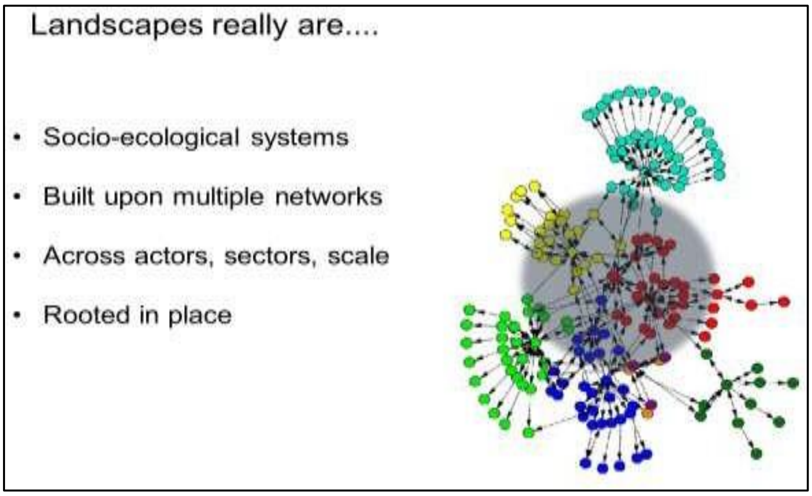



Figure 1. Schematic outlook of landscapes (Adapted after ICIMOD-CDI Wageningen, 2017).

The analysis of CREFLAT landscape must be seen in conjunction rather than a separate district-wise landscape. The common features, which might be influenced as per local norms and standards of governance, and other enabling policy and practice factors generally have a local context tagged to them.

Accordingly, landscapes of two project districts have the following major features (see also Figure 2):

- Socio-ecological and political systems (i.e., multiple perspectives)
- Different administrative boundaries
- Multiple actors, sectors, networks, and their perspectives at scale downwards (e.g., to Village/ADC levels)
- Inter province/district connects

- Interfacing of interventions and investments aiming coordination
- Rooted in place (people have sense of belongingness e.g., 60% tribal population of project area)

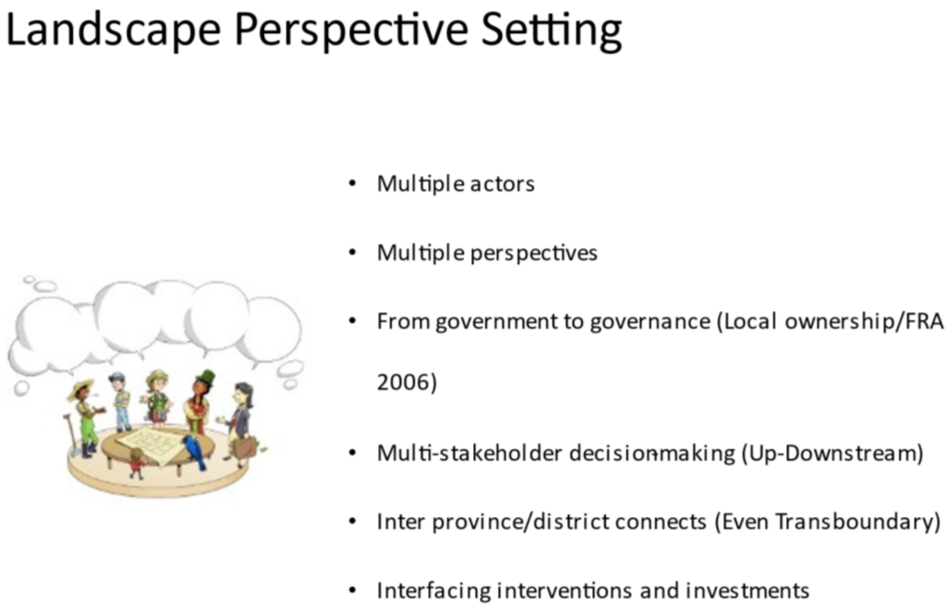



Figure 2. Schematic Features of CREFLAT Landscape (Adapted after ICIMOD 2019).

These features are succinctly represented in Figure 3 showing the interface of spatial, temporal, and cultural aspects defining a landscape. In broader terms, heterogeneity and socio-ecological patterns in a landscape might be influenced over time through a strong relationship of people with the landscape demonstrated by their traditional and modern uses and management systems. This is very much the case of project landscape as “Jhum Practice” and otherwise a prevalent dependence on forests is the common phenomenon. On the other hand, naturally landscapes are in evolving dynamics but can be influenced by strong user-interface that emerges especially from settled population that lives from the project landscape.

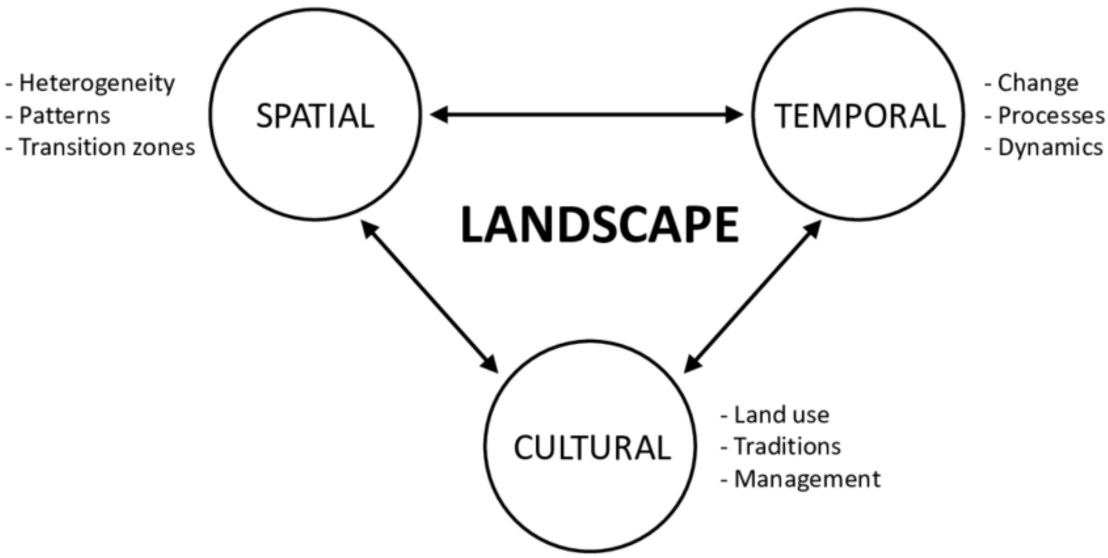



Figure 3. The interface of spatial, temporal, and cultural aspects defining a landscape.

In simple terms, the Landscape Approach can be defined as:

> *"Managing multiple land uses in an integrated manner, considering both, the natural environment and human systems" (World Bank)."*

### 1.1 Project Purpose

The project is envisaged to support sustainable forest management in Tripura, for contributing to the goal of project, which is to manage forest landscapes in Tripura in a sustainable and participative way for improving climate resilience of local population and ecosystems.

The module objective (outcome) of the project is that*: Forest landscapes in Tripura are managed in a sustainable and participative way for improving climate resilience of local populations and ecosystems.*

The project has been designed with five outputs which, when delivered, will contribute to enhancing climate resilience of forest landscapes in the project area. It is, therefore, able to contribute directly towards the overall objective of reducing forest degradation and increasing incomes of people in India's Northeast (NE) Region. Target groups of the Project are 130,000 persons. The project has five Key Outputs to reach outcome as follows:

1) Participatory village-based landscape planning system developed and implemented
2) Climate resilient forest land management implemented
3) Measures for mitigating adverse climate impacts on biodiversity applied
4) Natural resources products processing and marketing supported
5) Forest sector enabling environment supported

# 2 CREFLAT Project's Landscape Perspective

The CREFLAT project is under the Indo-German Development Cooperation Project II (IGDCP II), funded by the German Financial Co-Operation under the German Ministry for Economic Cooperation and Development (*Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung*, BMZ). In the Separate Agreement (SA) on the implementation of this project between Government of Tripura (GoT) and KfW (*Kreditanstalt für Wiederaufbau*; German Development Bank), it is envisaged that Landscape-based Village Development Plan will be the basic working unit. The landscape perspective planning within the CREFLAT project in Tripura has a guiding role to prepare village development plans that consider the climate resilience priorities at landscape scale while planning with local community. Therefore, a methodology for assessing landscape development perspective and its linkage with a participatory village development plan needs to be evolved keeping its mainstreaming across the two project districts/11 Blocks in view covering 191 villages. Two districts of Tripura namely, Dhalai and North Tripura (three Blocks within the project area) consist of predominantly forest-dependent tribal (ST) population and larger areas under forest cover. However, it needs to be added that development investment landscape in Tripura is changing fast and more donors and public schemes are being planned or implemented to cover the whole state. Also while implementing CREFLAT project, it will emerge whether project needs to work in 191 villages. Hence the current understanding is that the ultimate number of villages to be covered by the project could be up to/or below the above number given in SA.

IGDCP II focuses on the landscape components relevant for the welfare of target group with the aim of enhancing climate resilience and thus enabling forests and other lands to provide better and sustainable ecosystem services for dependent households. In getting better services, households are less likely to continue with practices that degrade natural resources and biodiversity, and will be supported to develop alternative livelihoods options that reduce their vulnerability.

The problem in the project area - which consists of forest landscapes in Dhalai and North Tripura Districts – can be defined as the vulnerability of these landscapes to the effects of climate changes/including those that are already taking place, and those that will inevitably continue in future. This vulnerability is due to degraded natural resource condition and a history of unsustainable use. Therefore, ecosystem services and products from these landscapes such as water, soil conservation, food security and biodiversity on which the target population heavily depends for their livelihoods, will be adversely affected. This will further exacerbate the vulnerability of the target households and, in the absence of viable alternatives, will lead to continuation of practices that result in further resource degradation and thus the increased vulnerability of landscapes and people who depend on them. The proposed solution is to plan and implement the envisaged project activities across all land categories in these landscapes that will enhance climate resilience and as a result, will reduce the vulnerability of dependent households to climate change. Ultimately, in selecting the critical landscapes and clusters for the project interventions, climate change vulnerability is the most important selection criteria. However, the selection of activities/outputs was also guided by:

1) Technical requirements of setting up the clusters (depending on the respective measures),
2) The situation in neighbouring villages, with their needs and potentials to implement similar activities, and
3) The commitment of participating villages and the manifested sense of ownership that they show for the interventions, e.g., by agreeing to make up-front investments or by contributing their manual labour to initiate the activity.

# 3 Participatory Village-Based Landscape Planning System Developed and Implemented

To enhance climate resilience CREFLAT will support the integration and prioritization of ecosystem functioning and services in land use planning on landscape and village level (Output 1). On the landscape level, it will support and encourage the establishment of networks of protective areas to conserve biodiversity and water resources (Output 3), while on the village level it will integrate measures to rehabilitate the landscape and restore the productive capacities of agricultural land and forests (Output 2). Project approach to establish climate resilient natural and planted forests balances three core interests: provide society with abundant and high-quality ecosystem services, provide a haven for biodiversity and a genetically rich depository of natural resources for future generations, and productive landscape and foundation for a thriving natural resource-based economy.

Output 1 that centres on landscape approach will be delivered through the following detailed activities:

- Preparation of up to 191 Village Development Plans (VDPs) for all target villages
- Producing a refined list of priority landscape level interventions informed by the VDPs, spatial analysis, economic analysis and commonalities in climate risks, impacts and vulnerabilities identified between areas
- Validation workshops to discuss identified interventions with key stakeholders
- Creation of 12-15 thematic clusters that facilitate planning and interlinkages between villages
- From above, the identification of 12-15 landscapes with a common set of interventions addressing vulnerabilities and/or common issues or potentials across a set of villages and that provide a common funding platform.

Participatory elements will be integral during the planning process for achieving the project's final objectives, in ensuring that the interventions supported reflect the genuine needs of the target groups, and are 'owned' by them to the extent that they are prepared to ensure the sustainability of any assets created. VDPs will later provide the basis for cluster-based interventions, which will be designed using a landscape-level approach.

This would enable the development of a cohesive plan that allows for multiple benefits and land uses over time, and which considers upstream-downstream dynamics and plethora of ecosystem services that emerge from a landscape managed through several land uses including forest use and its conservation. As the scope of the project is entire watershed areas and multiple villages and blocks, such an approach is justified and necessary. For landscape-level decision-making, there will be decision-making at block level (especially in terms of prioritization, as well as participatory planning) through the formation of thematic clusters. The identification of suitable solutions and activities across these clusters would be applied across all land categories. Thematic clusters of villages may comprise groups of villages with similar climate-related issues, relating to vulnerability and forest or land degradation or soil erosion (e.g., higher slope gradients predestined to cause natural disasters such as landslides during heavy rains): villages grouped around a watershed or otherwise with upstream-downstream water relations; villages with similar biodiversity conservation value; villages with common potentials for a forest product or for establishing a similar type of resource e.g., bamboo or areca nut. The formulation of thematic clusters of villages will enable treatments to be applied across a landscape for which the VDPICs and Blocks provide appropriate institutional arrangements of local planning and implementation. In other words, universal landscape vulnerability issues need to be embedded in VDPs through people's understanding and their suggestions to counter these at village-level.

Given the natural specificities and needs, the characteristics of Landscape Approach to be used for the development of CREFLAT Project Area can be aligned with:

- Forest Cover and Biomass changes – increase the Extent/Health/Quality/Diversity
- Holistic Aspects – involving entire watersheds, jurisdictions, biomes and mosaic of interdependent land uses
- Restoration – bringing back the biological characteristics and its productivity to achieve benefits for the people
- Long-term process – covering larger areas and longer time frames, which can produce short-term benefits as well.

If considered, these contribute to addressing resilience, ecosystem services and state/national development and conservation targets etc. at scale rather than at mere micro-scale (e.g., Gram Panchayat/ADC level) as potential outcome. These scales have a connection that can go from local to regional, and national to global scale (e.g., National Targets in SDGs and Commitments to CBD Agenda, etc.). For the sustainability context, policy and regulatory factors provide the enabling basis. These need to be backed by, delivery of governance by district/division institutions and the biophysical interventions and practices on the ground. Consequently, the outcomes and impacts that any province or state is targeting are achieved (e.g., achieving commitments made on SDGs, NDCs etc.).

# 4 Landscape Planning and Management Approach

The above conceptual framework implies understanding of existing land use, ecosystem services, degradation and threats to ecosystems, and capturing stakeholder dependencies and synergies in two districts and as a combined landscape of CREFLAT areas gaining significance. Managing trade-offs must include potential to maintain healthy ecosystems (e.g., providing ecosystem services at scale), and to sustain restorative efforts, productive agriculture and welfare of local communities. Hence, in today's context, integrated landscape management can be linked to the landscape approach. It seeks to provide tools and concepts for allocating and managing land to achieve social, economic, and environmental objectives in areas where agriculture, livestock keeping and other productive land uses compete with environmental and biodiversity conservation goals. On the other hand, it becomes inevitable to link biodiversity conservation to the overall socioeconomic development and future planned investments (e.g., in Project).

Furthermore, in pragmatic terms Landscape Management Planning as manifested in SA is closely associated with the **Participatory Approach** commencing from views, comments, and interest of the local community/VDPICs, ground-level officials to the higher levels with the active participation of multi-level and multi- sectoral actors so that long term interests and inclusive decision-making needs are met with.

Hence, the Landscape Perspective Plan will be further validated after ground truthing and consultations with identified communities (villages) while seeking their willingness and ownership of the process. A thorough field study of socio-economic and ecological cause and effects will also be conducted in the identified villages, using Participatory Rural Appraisal (PRA) and Participatory Action Research (PAR) methods. This will support in the development and refinement of the Village-Level plans, thereby fortifying the interrelation between the villages and the landscape, from a beneficiary perspective to inform the overall Landscape Perspective Planning.

Figure 4provides a stepwise approach for identifying landscapes based on cluster of villages and follows it up with the prioritisation of villages for initiating the participatory process, as elaborated for each Step hereafter.


Figure 4. Identification of Landscapes and Villages.

## 4.1 Step 1

In Step 1, high-resolution satellite remote sensing data (openly sourced or provided by TFD) can be used to derive information on canopy cover, vegetation, and other natural resources. This information will be used to estimate the area, distribution, and condition of various forest types. A recent, substantial set of information is already with TFD/SCATFORM Project and can be requested through the PMA of CREFLAT, in order to not only be efficient with time and resources but also for uniformity purpose so that TFD is facilitated in mainstreaming of standard methodology across the state by converting good outputs in to outcomes.. In simple terms, a higher scale of degradation/increased area of open forests must be ranked higher from the angle of intervention priority. Also, such degraded areas are bound to suffer in terms of impoverishment of biodiversity. However, the PMC initially is supporting thepreparation of basic methodology for landscape and village identification such as the current document.

A GIS-based site suitability analysis was used to identify a cluster of six to 8 or more villages using spatial layers as landscape indicators (table 1) to perform grid-based analysis in two steps:

1) At district level using input of Climate vulnerability, Forest degradation status and Modified Human development index. Internal weights were assigned to each layer with values ranging from 0 to 5.
2) At village level using where proximity to Milli-watershed and prioritised villages was weighted for villages' spatial layer of project area districts.

Table 1. Spatial layers used as landscape indicators.

| Layer | Source |
|---|---|
| Climate vulnerability index | Adapted for Tripura state from Rabindranath et al 2010 |
| Forest Degradation status | From land use / land cover, generated from high-resolution satellite data 2021-22 |

| | |
|---|---|
| Modified Human Development Index | Parameters from Census of India report – Tripura State, 2011 |
| Watershed layer | Derived from Carto sat DEM (Digital Elevation Model) |
| Prioritised villages | IGDC-CREFLAT |
| Village layer | Generated using SOI top maps (1:50,000 or 1:63,000 wherever available) and census of India 2011 maps. |

Further, the spatial layers were individually ranked on a scale from 1 to 5 based on their relative importance. A geospatial analysis was thus done and a score for each village was developed which enabled identification of landscapes recommended for implementation of project in Phase 1. In this context, Annex 1 shows an example of landscape distinguished based on Digital Elevation Model covering distinct catchment area, thus taking slope gradients on board for estimation of vulnerability. Hence vulnerability of the landscape overall is taken up as combination of degradation and intensity of slopes.

This methodology can be improved when baseline survey methodology to designate landscapes and organizing of the cluster of villages within the landscape are available. It can be safely assumed that wherever there is higher degradation, forest cover will be lesser and in turn, vulnerability of forest ecosystems will affect ecosystem services and livelihoods alike to climate change. Heavy Degradation in and around the village would also mean lesser availability of local bio-resources and thus greater pressure to new or neighbouring areas. A provisional schematic categorization of initial landscapes is given in Figures5, 6, 7 and 8 based on degradation/vulnerability in 11 Blocks of above two project districts.

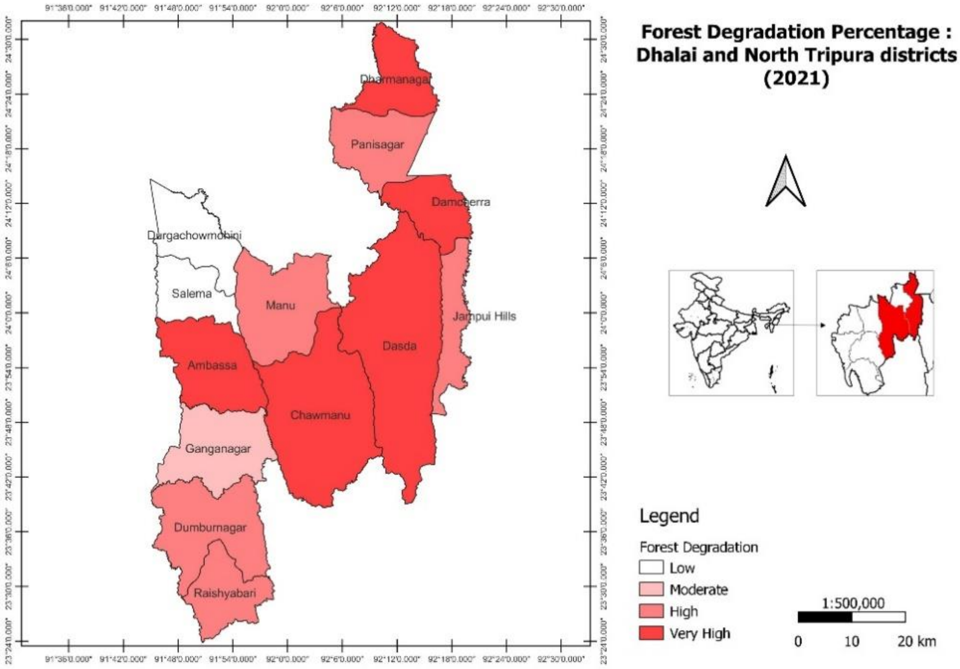



Figure 5. A provisional categorization of degradation in blocks of Dhalai and North Tripura districts (Draft).

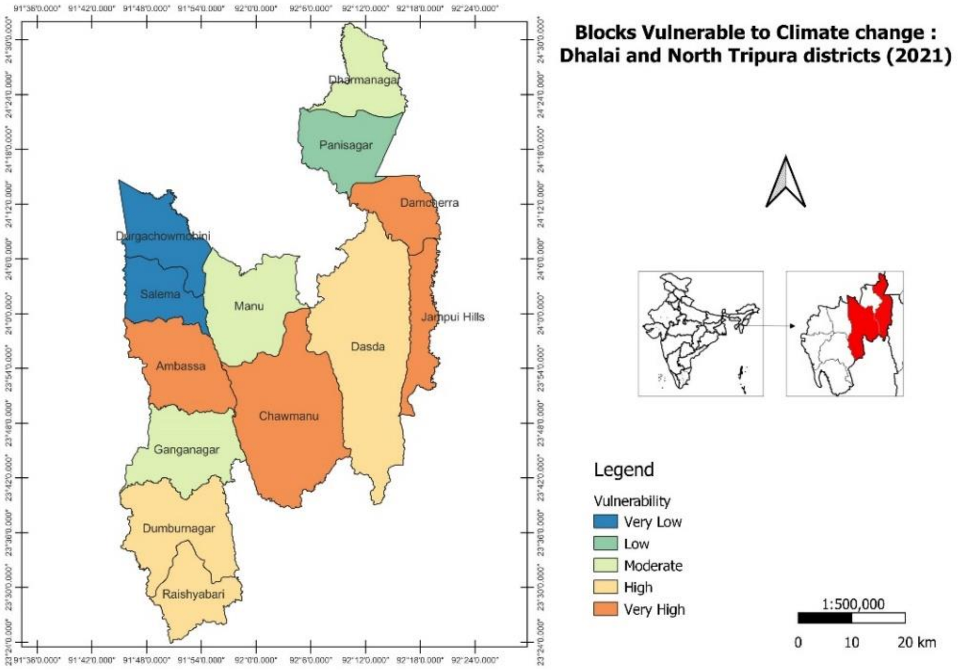



Figure 6. Vulnerability levels of selected blocks in which landscapes are located (Draft).

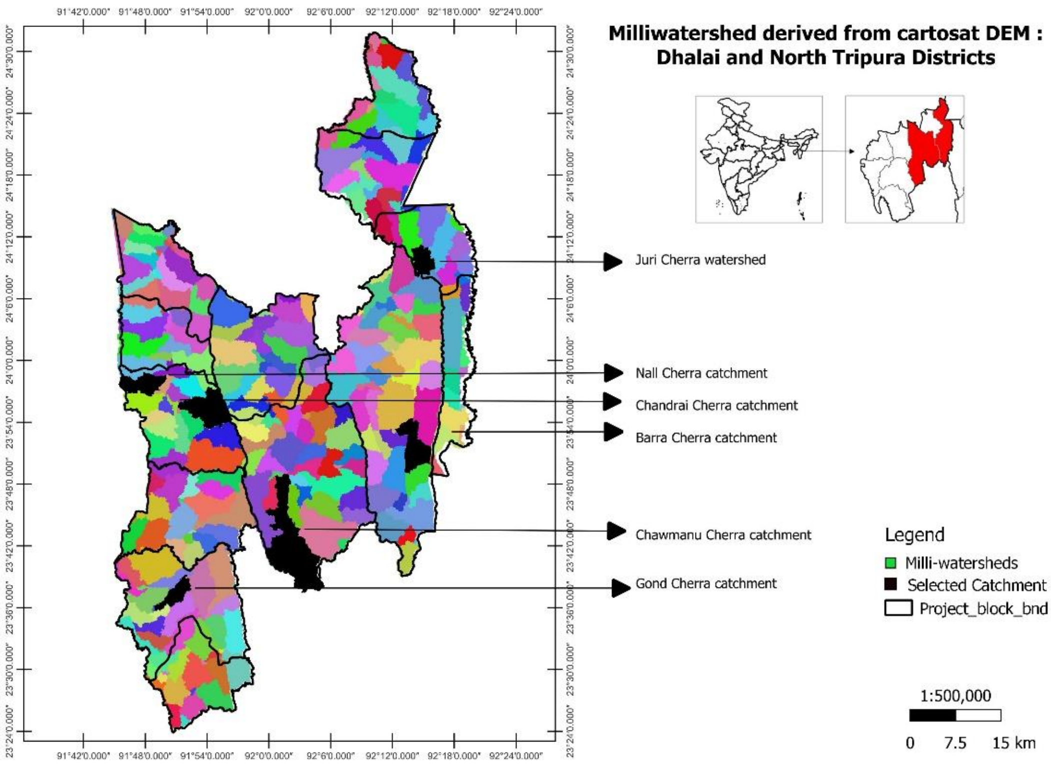
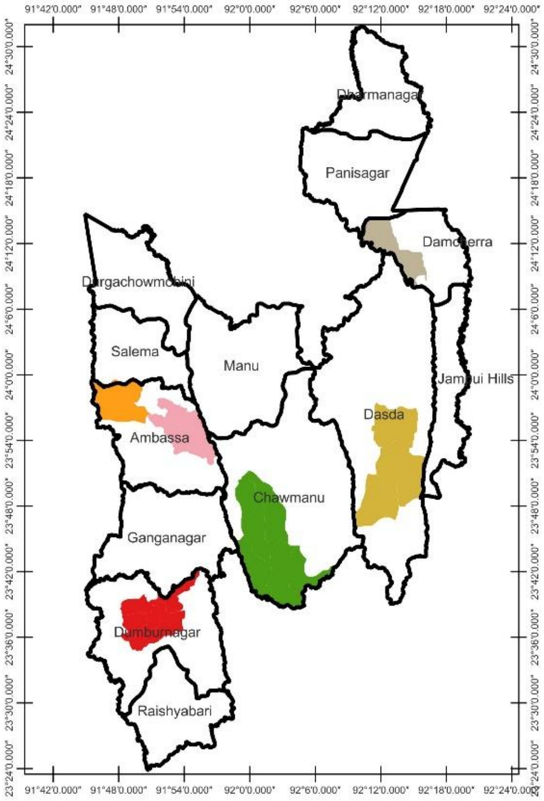
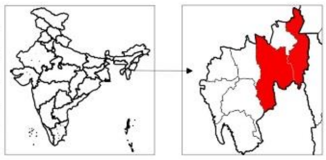



Figure 7. Watersheds in project district with overlaid selected catchments (Draft).




**Recommended landscapes for project implementation in phase 1 : Dhalai and North Tripura districts (2021)**

| Landscape | Villages |
|---|---|
| Nallicherra landscape | Paschim Nallicherra |
| | Ghantacherra |
| | Basudebpur |
| | Kachimcherra |
| | Uttar Nallicherra |
| | Purba Nallicherra |
| | Kekmacherra |
| Chandrai landscape | Bagmara |
| | Shikaribari |
| | Kathalbari |
| Gond landscape | Ultacherra |
| | Dalapati |
| | Sarma |
| | Purba Gandacherra |
| | Jinaipara |
| Chawmanu landscape | Natin Manu |
| | Purba Chawmanu |
| | Paschim Chawmanu |
| | Paschim Gobindbari |
| | Purba Gobindbari |
| Bara landscape | Kakcheng para |
| | Gachirampara |
| | Kalapani |
| Juri landscape | Juri R.F |
| | Thumsarai para |



Legend
- Project_block_bnd
- Gond_landscape
- Nallicherra_landscape
- Chandrai_landscape
- Juri_landscape
- Bara_landscape
- Chawmanu_landscape

1:500,000
0 10 20 km

Figure 8. A provisional categorization of initial six landscapes (Draft).

Annex 2 shows an example of Land use-Landcover mapping for the recommended landscapes in Tripura, which can be used for scaling up the proposed methodology of selecting landscapes and villages therein.

Vulnerability to climate change of each landscape can be then derived from existing district level data on vulnerability index/state action plan for climate change or from Climate Vulnerability Assessment for the Indian Himalayan Region Common Framework (2018-19), prepared by Ministry of Science and Technology and Swiss Development Cooperation. In addition, any other applied methodology to select landscapes prevalent with TFD can be looked into for customization within CREFLAT (e.g., SCATFORM). However, climate vulnerability assessment as derived so far remains same for a particular district or block, whereas slope gradients can be varied and can be captured based on digital elevation models/watershed data available at local block/district levels. Hence as an alternative, slope gradients of project landscapes can be potentially used to gauze vulnerability due to degradation and extreme weather events causing commonly heavy soil erosion/landslides etc. thus note only reducing the fallow period of Jhum areas but also leading to sedimentation of rivers/rivulets in downstream. For prioritizing villages, it is mentioned that Dhalai is categorized as mid- to highly vulnerable district according to the above framework. In the Table 1, it is assumed that areas that have degradation and higher slope percentage are much more prone to soil erosion, flooding and landslides thus increase the hazards of climate change. In identified landscape, all villages will be piloting villages and ranking needs to be done for selecting the first village where we start the participatory processes for VDP. The village with maximum degraded area should be given highest ranking for selection (50% weightage, see Table 4), based on problem description of the project area. The actual existing current values on climate change vulnerability (e.g., extreme events, temperature, rainfall etc.) can be then used to endorse the vulnerability context.

This is in alignment with the recommendation made in SA that Micro-watersheds with more than 40% degraded area or at least 300 ha of potential forest regeneration land must be prioritised for inventions and investments. Table 2 below provides a simple method for prioritizing landscape and villages associated with it as an example. In the proposed method, the two criteria “Degradation” and “Vulnerability Index” are weighted equally. In other words, the landscape ranked first could be given priority, as it is heavily degraded as well as very vulnerable. Accordingly, in the Step 2, the focus will be shifted to selection/prioritizing of villages.

Table 2. Landscape selection priority setting* based on vulnerability caused by intensity of landscape degradation and scale of slope gradients.

| **Landscapes** | **Degradation** (Denuded and open vegetation Area, in %) | **Slope Gradients**(average % of slope) | **Sum** | **Step 1 Ranking** |
|---|---|---|---|---|
| Landscape 1 | 50 (3) | 30 (4) | 80 | 3 |
| Landscape 2 | 60 (2) | 40 (1) | 100 | 2 |
| Landscape 3 | 30 (4) | 25 (5) | 55 | 5 |
| Landscape 4 | 25 (5) | 33 (3) | 58 | 4 |
| Landscape 5 | 70 (1) | 36 (2) | 106 | 1 |

**Note: Highest Rank 1 and Lowest Rank 5*

As a general sum-up to this Step, remote sensing data will give us a good account of degraded forest area/and logically the first impression on how much land is potentially available for physical treatment. Surely, not all land may be agreed by local communities to be given for restoration/rehabilitation. Once we select the landscape, we can use early process step of VDP preparation and also in-advance village socio-demographic and other forest/land use related data to be collected by VCWs and that primary/secondary data then helps us to narrow down to landscape as well as the first set of villages. Surely, project teams should go to landscape with the logic that all villages would like to participate and if our first set of awareness and participatory approach steps are effective then FPIC in the very early first or second village meetings should follow.

## 4.2 Step 2

It is based on the premise that Step 1 will provide the first list of landscapes as well as the landscape with largest potential to start the piloting phase. This could be likewise the starting point for selection of first set of villages within the Planning and Piloting Phase of the project. In this step (Figure 4), secondary data can be used (i.e., once we fix the landscape) on Poverty and Human Development Index using District/Block level secondary data to narrow down to the first operational village amongst the identified cluster/landscape. Apart from this, Free Prior Informed Consent (FPIC) process can be used to get the final selection of highly ranked village. For instance, if the village ranked first does not agree to be part of the project then focus could shift to the village ranked second and so on. Generally, villages would accept the project after the very first awareness-building meeting. In a different context, in some of the clusters/landscapes, CREFLAT Project has already carried out plantation programmes under Output 2 and 3. Since their reimbursement is on hold, it could be considered that such villages are given priority in preparing VDP, as already carried out plantations on forest land will also need the ownership of JFMC/VDPIC at the earliest for seeking reimbursements from KfW as well as early protection and management (Giving 30% weightage). This step also assumes that a higher level of poverty in project areas would also mean a higher dependence on forests and therefore could be resulting to overuse and degradation of forest cover. In turn, such a selection process can adhere to recommendations made in SA.

Table 3.Selection of Villages based on Poverty and HDI Score*.

| **Landscape 1** | **Poverty** (% of BPL HHs) | **HDI Score** | **Sum** | **Step 2 Ranking** |
|---|---|---|---|---|
| Village 1 | 45 (3) | 40 (1) | 85 | 2 |

| | | | | |
|---|---|---|---|---|
| Village 2 | 70 (2) | 30 (4) | 100 | 1 |
| Village 3 | 35 (5) | 32 (3) | 67 | 4 |
| Village 4 | 40 (4) | 30 (4) | 70 | 3 |
| Village 5 | 65 (1) | 35 (2) | 100 | 1 |

**Note: Highest Rank 1 and Lowest Rank 5*

Figure9shows the Human Development Index (HDI) and can also use poverty criteria as an alternative or together based on existing data on each Block, and accordingly villages are ranked from low to very high levels. This should facilitate the prioritization, as most disadvantaged target groups need an early intervention from the project and are very much recommended in SA.

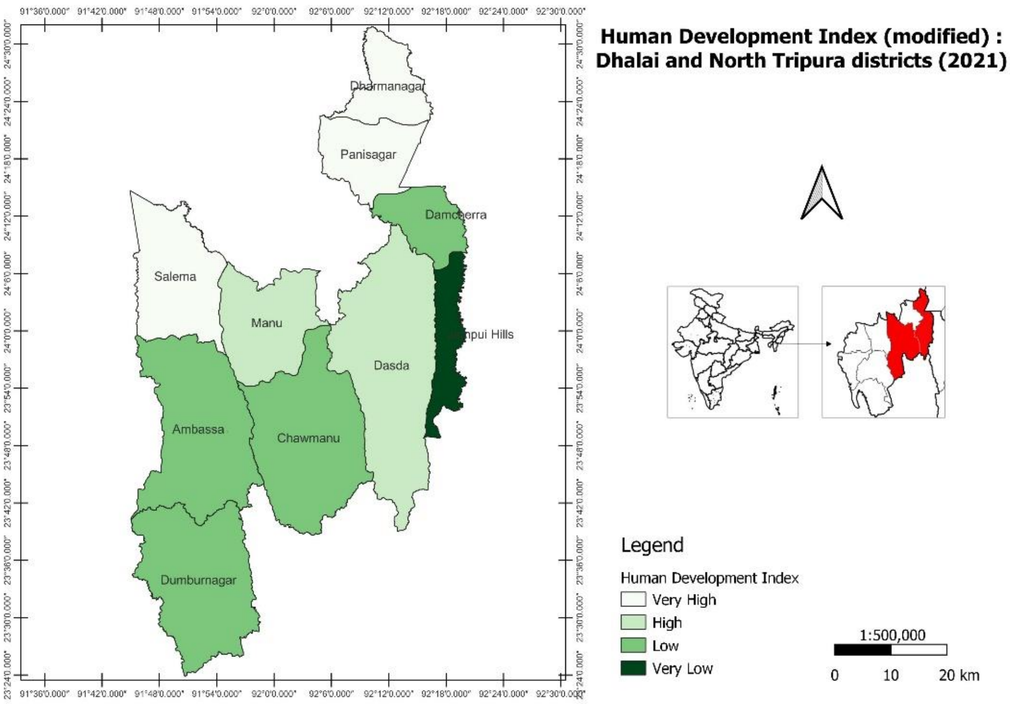



Figure 9. Human Development Index for two project districts.

## 4.3 Step 3

As the further step to prioritization of villages within a landscape, step 3 can use three types of criteria. However, categorization done in Table 3 uses the risks that are involved and make people more vulnerable, which is decided by, if they have strong or weak institutions (e.g., non-functional JFMC), If village has very limited infrastructure (e.g., limited road connection and accessibility), and finally due to poor accessibility a very limited benefit of public schemes. The latter can be the case especially in poorly accessible villages (e.g., far away from road head) where often public schemes outreach is poor. For instance, if infrastructure is very poor and public schemes are not reaching to village then investing hugely in livelihoods would need a very careful planning, as timely transport and marketing of produce would be full of difficulties.

Table 4. Ranking of villages as per the three criteria, Institutional strengths, Infrastructure and Outreach of Public schemes.

| **Landscape 1** | **Institutions** (schools, | **Infrastructure/Assets** (No. of government | **Public schemes** (PMGSY, | **Sum** | **Step 3 Ranking** |
|---|---|---|---|---|---|

| | PHC, JFMC, WUC) | buildings, Panchayat Bhavan, roads) | PKKKY, MGNREGA) | | |
|---|---|---|---|---|---|
| Village 1 | 40 (4) | 25 (3) | 35 (5) | 100 | **5** |
| Village 2 | 50 (2) | 40 (1) | 70 (1) | 160 | **1** |
| Village 3 | 45 (3) | 20 (4) | 50 (3) | 115 | **3** |
| Village 4 | 30 (5) | 35 (2) | 45 (4) | 110 | **4** |
| Village 5 | 55 (1) | 40 (1) | 60 (2) | 155 | **2** |

***Note:*** *Higher Risks, Medium, Low Risks for village HHs (Infrastructure: 40 as absolute value would mean much lesser than basic infrastructure needed for a village and over 70% Public schemes could mean that outreach of government programmes is quite good)*

## 4.4 Final Ranking of Villages

Table 4 makes the overall assessment of 3-Step rankings done above. As mentioned earlier, a 50% advantage is given to landscapes that are degraded and vulnerable. Similarly, in Step 2 and 3, the focus is on the selection of priority villages but with lesser weightage at 30% and 20% respectively (i.e., values given within each step above are accordingly multiplied by 0.5, 0.3, and 0.2 respectively). In the far-right last column, the overall ranking of villages emerges. The advantage of this methodology is that we prioritize landscape with restoration/value addition potential, and take up villages as priority that deserve it most.

Table 5. Overall ranking of villages within a priority landscape.

| **Total Step 1** | **Weightage 50% (x)** | **Total Step 2** | **Weightage 30% (x)** | **Total Step 3** | **Weightage 20% (x)** | **Total** | **Total & Ranking of Villages** |
|---|---|---|---|---|---|---|---|
| 80 | 40 | 85 | 25.5 | 100 | 20 | **85.5** | **3** |
| 100 | 50 | 100 | 30 | 160 | 32 | **112** | **2** |
| 55 | 27.5 | 67 | 20.1 | 115 | 23 | **70.6** | **5** |
| 58 | 29 | 70 | 21 | 110 | 22 | **72** | **4** |
| 106 | 53 | 100 | 30 | 155 | 31 | **114** | **1** |

*Note: Ranking 1 would mean the village to be taken up first*

It is mentioned here that we don't need a full FPIC to get an idea of whether villagers want to participate or not. Some kind of initial conversation with villagers about the overall suitability of the village in terms of people's readiness, as well as an assessment of the availability of land for the project, would be helpful. As mentioned above, VCW's and TAs are expected to go to potential project villages for in-advance village level data collection. Such meetings can be used to do the initial conversations on the availability of actual land size for green investment and also preparedness of local community readiness to join the project.

# 5 Conclusion

The above methodology to select priority landscapes and priority villages within the planning and piloting phase may be experience few uncertainties. For instance, we may have the priority landscape as well as high priority village therein, but we still need to go through the FPIC process. Willingness of the local population to participate in the project activities respecting its core principles is a must situation.

It may happen that the priority village needs more time to decide or do not want to participate with the project. In this scenario, the second ranked village can be approached. All other situations such as reigning conflicts within the village between paras or between two neighbouring villages, is the information that is made available only after FPIC and VDPIC process is started. It is also clear that Participatory Planning Process can begin only after successful culmination of early process of consent by the VDPIC to initiate the project.

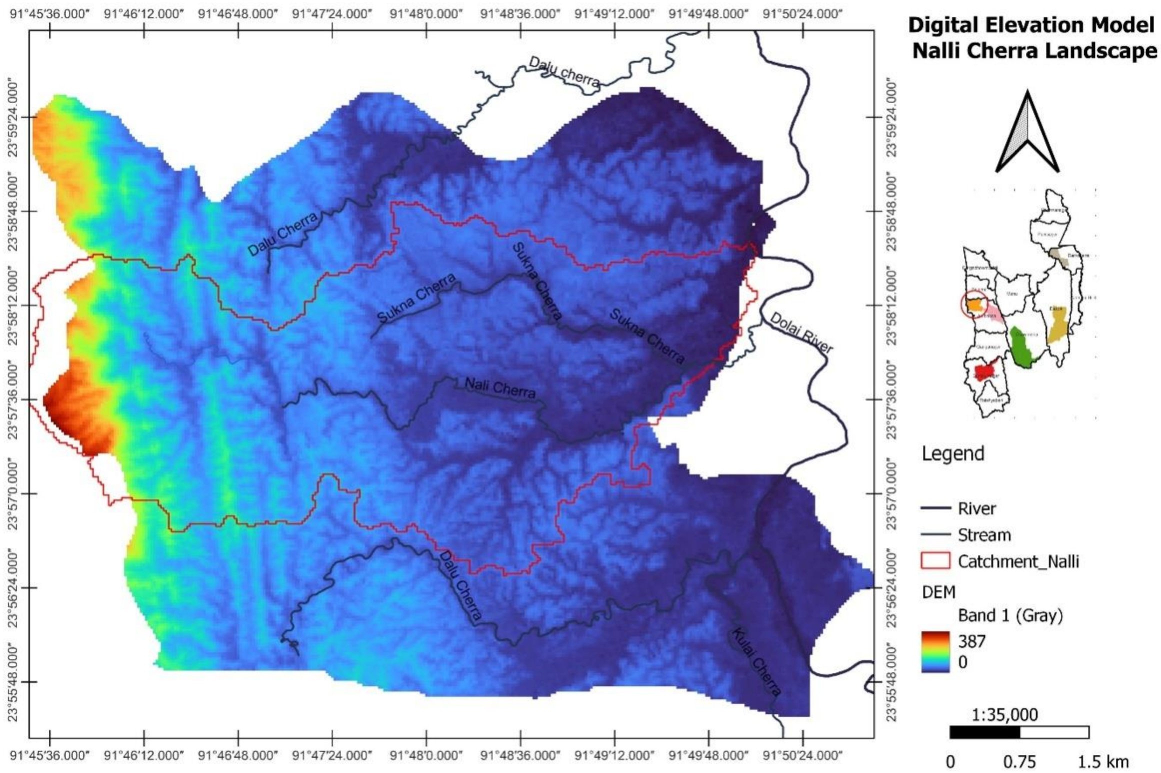
However, it needs to be underlined that CREFLAT Project is keen to initiate the process of planning and piloting phase in villages where plantations and SWC works are done without prior “No Objection” by KfW. Therefore, it is underlined that while baseline survey is done, the efforts will be made cover most of the villages where such works are done but this should not be the norm. Project needs to stick to a standard process of selecting working landscape as well as the priority intervention villages in the selected landscape.

Moreover, the above methodology can be further sharpened once baseline data and early experience from participatory planning are made available.

All in all, the first landscapes to be taken during the Planning and Piloting phase are assuming that each selected landscape could have 6 to 8 villages so that an approximate 55 villages can be taken up to trigger interventions under different outputs of the project. So far, it is indicative that we may have an average of 8 villages in a landscape so that the target of 191 villages is reached, we may have around 24 landscapes by the end of full implementation phase. However, as clarified above, ultimately CREFLAT Project may treat lesser number of villages than mentioned in SA. This also since, the current number of villages of 191 was taken from the feasibility study when project was conceived and real-time scenario will emerge only during the Planning and piloting phase, which is in operation now.

# Annexes

## Annex 1: Landscape Distinguished Based on Digital Elevation Model Covering Distinct Catchment Area (Using slope as parameter)



## Annex 2:Land Use / Land Cover Mapping for the Recommended Landscapes in Tripura

High-resolution land use-land cover mapping of NallicherraLandscape was done using satellite data. Well distributed land use reference points (GPS) collected during field visits to the area were used (table a) along with reference from the 2021 LULC map (1:50,000 scale) shared by JICA Tripura project.

The land use / landcover classes were interpreted at a variable scale of 1:2000 to 1:5000 using very high-resolution (< 5m) data from World View high-performance satellites. The open source cross-platform desktop geographic information system – QGIS was used for the purpose of analysis and mapping.

As per the area statistics (Table b) of the prepared landuse / landcover map, the majority of the area (50%) is forest and a substantial proportion (18%) is utilised by commercial plantations.

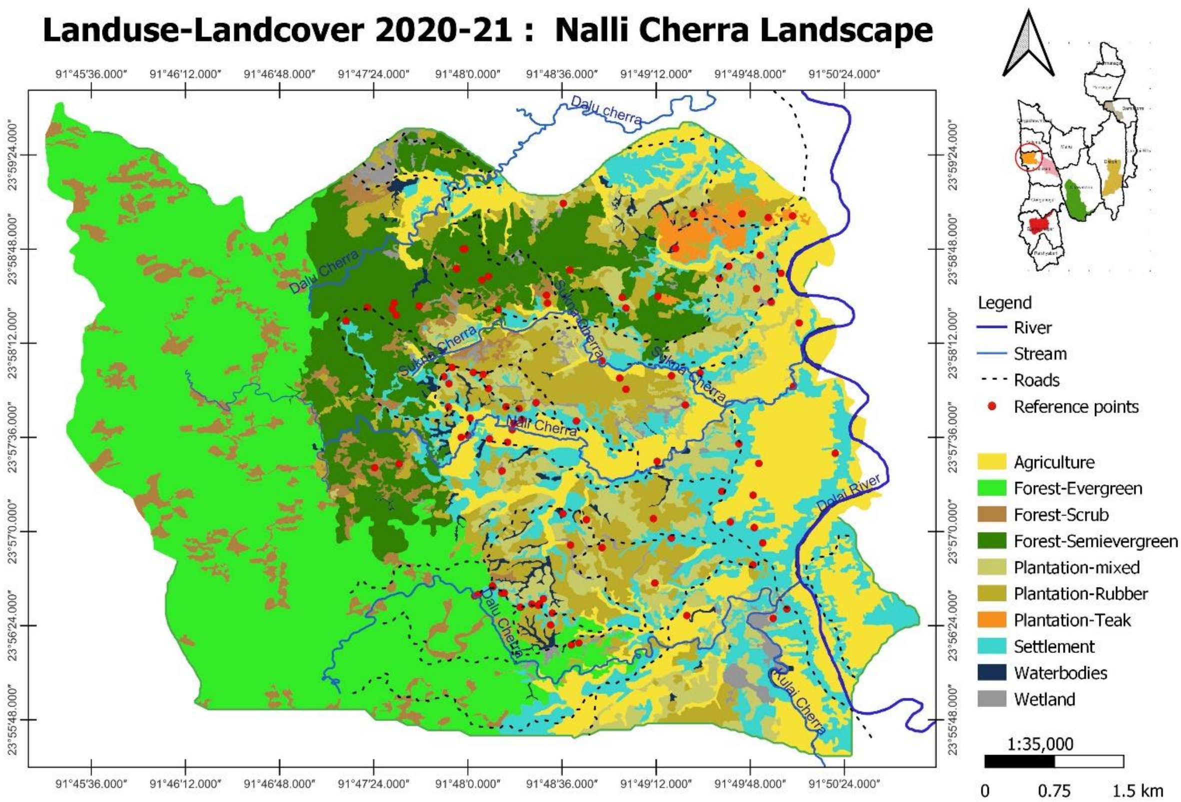



Table a. Land use / land cover area statistics.

| Land use class | Area (ha) | Area (%) |
|---|---|---|
| Agriculture | 905.96 | 16.95 |
| Forest-Evergreen | 1718.76 | 32.2 |
| Forest-Scrub | 305.1 | 5.7 |
| Forest-Semi-evergreen | 655.77 | 12.28 |
| Plantation-mixed | 417.46 | 7.81 |
| Plantation-Rubber | 501.13 | 9.38 |
| Plantation-Teak | 45.75 | 0.86 |
| Settlement | 636.43 | 11.91 |
| Waterbodies | 78.85 | 1.48 |
| Wetland | 77.06 | 1.44 |

| | | |
|---|---|---|
| Total | 5342.27 | 100 |

Table b. Land Use Reference Points used for classification.

| fid | Latitude | Longitude | Landuse / Landcover |
|---|---|---|---|
| 1 | 91.82328 | 23.94107 | Wetland |
| 2 | 91.81427 | 23.96813 | Rubber Plantation |
| 3 | 91.8168 | 23.96511 | Rubber Plantation |
| 4 | 91.8202 | 23.97497 | Teak Plantation. |
| 5 | 91.83391 | 23.94177 | Home Garden and Wet Land |
| 6 | 91.83193 | 23.98335 | Rubber Plantation |
| 7 | 91.80724 | 23.96367 | Home Garden and Wet Land |
| 8 | 91.82789 | 23.951 | Home Garden and Wet Land |
| 9 | 91.82773 | 23.97818 | Home Garden and Wet Land |
| 10 | 91.81153 | 23.96173 | Rubber Plantation |
| 11 | 91.82915 | 23.98374 | Teak Plantation. |
| 12 | 91.8346 | 23.96541 | Home Garden and Wet Land |
| 13 | 91.81012 | 23.95188 | Home Garden and Wet Land |
| 14 | 91.8288 | 23.95931 | Home Garden and Wet Land |
| 15 | 91.83093 | 23.95722 | Home Garden and Wet Land |
| 16 | 91.83244 | 23.94077 | Home Garden and Wet Land |
| 17 | 91.83031 | 23.95385 | Wet Land |
| 18 | 91.83904 | 23.95831 | Wet Land |
| 19 | 91.81681 | 23.97374 | Teak Plantation |
| 20 | 91.82699 | 23.95426 | Wet Land. |
| 21 | 91.81427 | 23.94828 | Home Garden and Wet Land |
| 22 | 91.83134 | 23.94878 | Home Garden and Wet Land |
| 23 | 91.83451 | 23.98352 | Home Garden and Wet Land |
| 24 | 91.83222 | 23.97441 | Home Garden and Wet Land |
| 25 | 91.81987 | 23.94452 | Mixed Plantation |
| 26 | 91.83068 | 23.9758 | Home Garden and Wet Land |
| 27 | 91.81973 | 23.95136 | Rubber Plantation |
| 8 | 91.81615 | 23.96629 | Mixed Plantation |
| 29 | 91.81261 | 23.95125 | Home Garden and Wetland |
| 30 | 91.81641 | 23.97487 | Mixed Plantation |
| 31 | 91.82163 | 23.9493 | Home Garden and Wet Land |
| 32 | 91.82164 | 23.96655 | Rubber Plantation |
| 33 | 91.83328 | 23.97743 | Home Garden and Wet Land |
| 34 | 91.82312 | 23.96343 | Rubber Plantation |
| 35 | 91.83044 | 23.95041 | Home Garden and Wet Land |
| 36 | 91.83522 | 23.97215 | Home Garden and Wet Land |
| 37 | 91.81092 | 23.94855 | Rubber Plantation |
| 38 | 91.8303 | 23.94644 | Home Garden and Wet Land |
| 39 | 91.82673 | 23.97687 | Rubber Plantation |
| 40 | 91.82012 | 23.95744 | Home Garden and Wet Land |

| fid | Latitude | Longitude | Landuse / Landcover |
|---|---|---|---|
| 41 | 91.82208 | 23.98006 | Rubber Plantation |
| 42 | 91.83108 | 23.97933 | Home Garden and Wet Land |
| 43 | 91.82395 | 23.98374 | Rubber Plantation |
| 44 | 91.81015 | 23.98486 | Rubber Plantation |
| 45 | 91.79011 | 23.95677 | Rubber Plantation |
| 46 | 91.7927 | 23.95719 | Rubber Plantation |
| 47 | 91.80363 | 23.95643 | Rubber Plantation |
| 48 | 91.81085 | 23.97777 | Mixed Plantation |
| 49 | 91.80836 | 23.9751 | Mixed Plantation |
| 50 | 91.80847 | 23.97425 | Mixed Plantation |
| 51 | 23.95985 | 91.80231 | Habitation |
| 52 | 23.95947 | 91.80422 | Habitation |
| 53 | 23.96081 | 91.80472 | Habitation |
| 54 | 23.9615 | 91.80488 | Habitation |
| 55 | 23.9619 | 91.80575 | Habitation |
| 56 | 23.96305 | 91.80545 | Rubber Plantation |
| 57 | 23.96326 | 91.80405 | Rubber Plantation |
| 58 | 23.96518 | 91.80221 | Rubber Plantation |
| 59 | 23.96669 | 91.80163 | Rubber Plantation |
| 60 | 23.96689 | 91.80058 | Rubber Plantation |
| 61 | 23.96742 | 91.79832 | Rubber Plantation |
| 62 | 23.96644 | 91.79748 | Habitation |
| 63 | 23.96323 | 91.79793 | Wetland |
| 64 | 23.96204 | 91.80026 | Habitation |
| 65 | 23.9602 | 91.80004 | Habitation |
| 66 | 23.96 | 91.7993 | Mixed Plantation |
| 67 | 23.9657 | 91.798 | Mixed Plantation |
| 68 | 23.94286 | 91.80803 | Habitation |
| 69 | 23.94216 | 91.8075 | Habitation |
| 70 | 23.94228 | 91.8068 | Habitation |
| 71 | 23.94194 | 91.80561 | Habitation |
| 72 | 23.94346 | 91.80361 | Habitation |
| 73 | 23.94412 | 91.80268 | Habitation |
| 74 | 23.94332 | 91.80114 | Forest |
| 75 | 23.97357 | 91.80323 | Habitation |
| 76 | 23.97395 | 91.79483 | Dense Forest |
| 77 | 23.97428 | 91.79218 | Dense Forest |
| 78 | 23.97362 | 91.79198 | Dense Forest |
| 79 | 23.97298 | 91.79238 | Dense Forest |
| 80 | 23.9738 | 91.78933 | Dense Forest |
| 81 | 23.98 | 91.7995 | Dense Forest |
| 82 | 23.98 | 91.7997 | Dense Forest |
| 83 | 23.9771 | 91.8022 | Dense Forest |

| fid | Latitude | Longitude | Landuse / Landcover |
|---|---|---|---|
| 84 | 23.97236 | 91.78706 | Open forest (<10% canopy cover) |
| 85 | 23.9767 | 91.8015 | Open forest (<10% canopy cover) |
| 86 | 23.9779 | 91.7988 | Degraded forest (<30% canopy cover) |
| 87 | 23.96683 | 91.82467 | Sal Plantation |