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Choosing Right:

Analysing NGO interventions in sustainably managing forest common pool resources

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Abstract

Forest resources often provide invaluable services to local communities who are dependent on them, especially in the Global South. Such forests may be common pool resources (CPRs), characterised by high non-excludability and subtractability. Scientific literature argues that CPRs are best managed by local users. Despite a strong trend of devolving power from governments to forest dwellers, communities sometimes lack the ability to manage their forest resources. Thus, many non-governmental organisations (NGOs) have risen in response. While NGOs are highly prevalent in forest CPR governance, few scientific studies explore their interventions in CPR management.

Focussing on the Western Ghats of India, this thesis describes how NGOs intervene in the collective management of forest CPRs. It further compares these results against scientific literature identifying conditions required for successful CPR governance. It asks, *how do NGO interventions within forest common pool resources in the Western Ghats compare with scientific literature on successful collective action?*

To answer this question, 12 design principles were identified through a literature review. Relying heavily on work by Agarwal (2001), Cox et al. (2010) and Ostrom (2015), they address a community's ability to sustainably manage forest CPRs, focussing on rights, capacity, benefits and participation. Theory of Change was used to visualise NGO interventions as outputs, outcomes, and impacts, connecting these to rationales and challenges NGOs face.

Taking NGOs as the unit of analysis, 10 most-similar cases of NGOs were identified by snowball sampling. Data was collected through semi-structured interviews and document analysis. This data was analysed by coding it against Theory of Change elements and design principles.

It was found that NGOs are active in 13 broad programme areas. They undertake interventions that actively restore local ecosystems, build community capacity and awareness, and improve community incomes. Further, all NGOs utilise many design principles in some way but are less likely to implement interventions that address harvesting rights, proportional benefit sharing, conflict resolution and graduated sanctioning. Reasoning for interventions ranged from NGO mandates, local needs and contexts and funding. Challenges included community reluctance, local politics and difficult terrain.

This thesis seeks to better connect practice and science and enable the sharing of ideas on how best to manage forest CPRs. To this end, it proposes implications for how science should consider NGOs in CPR spaces and provides practitioners with a set of interventions, connected to design principles, that they could consider implementing. Finally, it suggests future directions for new research.

Keywords: *NGOs, forests, common pool resources, design principles, Western Ghats, India*

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Glossary

CPR – Common Pool Resource

FRA – Forest Rights Act, 2006

Gram Panchayat – Elected village government

Gram Sabha – Village assembly consisting of all village residents above the age of 18

NGO – Non-governmental organisations

NTFP – Non Timber Forest Produce

PESA – Panchayats (Extension to Scheduled Areas) Act, 1996

1. Introduction

Forest ecosystems around the world provide a host of essential ecosystem services. These include provisioning services like food, medicines, timber, etc., regulating services like maintaining the climate, supporting services like water and nutrient cycling, and cultural services like being of spiritual or religious importance (Brockerhoff et al., 2017).

While forests have benefits on multiple scales from the global to the local, the communities that most rely on these services are the ones that live in or next to forests. This is especially true in developing countries where local (often poor) communities depend on forests to meet their livelihood needs (Barnes, 2017; Brockerhoff et al., 2017; Nunan, 2020).

Forests on which communities depend can be considered as common pool resources (CPRs). This means that they have high non-excludability (difficult to prevent users from accessing the resource) and high subtractability (vulnerable to overharvesting) (Barnes et al., 2017; Barnes & van Laerhoven, 2015; Gupta et al., 2020; Persson & Prowse, 2017). These resources are prone to collapsing easily as individual users can draw full benefits without bearing a higher portion of the costs of using the resource (Barnes & van Laerhoven, 2015; Persson & Prowse, 2017). Around the world, such forest resources are quickly disappearing due to numerous factors including overexploitation, land use changes, deforestation, etc. (Brockerhoff et al., 2017). Thus, sustainable forest management has become increasingly important.

It has been suggested CPRs can be effectively managed through collective action of involved stakeholders and the formation of institutions to govern them (Barnes et al., 2017; Barnes & van Laerhoven, 2015; Gupta et al., 2020; Persson & Prowse, 2017). Accordingly, there is a rich body of literature that attempts to describe the conditions necessary for the emergence and endurance of collective action (Agrawal, 2001; Baggio et al., 2016; Cox et al., 2010; Ostrom, 2015).

At the same time, there has been an increasing trend of decentralisation in forest management, with the transfer of power from national governments to local communities. This is especially true in many developing countries, where forest resources have long been managed by governmental actors. Given the sudden transfer of responsibility, many communities find it challenging to organise and collectively govern commons (Gupta et al., 2020; Persson & Prowse, 2017).

In response to these difficulties, numerous non-governmental organisations (NGOs) have emerged to promote the welfare of forests and the communities that depend on them. The term ‘NGO’ refers to officially established organizations run by employed staff that are well-supported (by domestic or international funding), and are relatively large and well-resourced (Mercer, 2002). These organisations may function as bridging actors, connecting

the rest of the world with the community while promoting collective action through a host of activities (KimDung et al., 2016). These activities could include awareness spreading, resource quantification, conflict resolution, community and gender empowerment, etc. (Barnes et al., 2017; Barnes & van Laerhoven, 2015; Gupta et al., 2020).

While much research has been done on governing CPRs (Agrawal, 2001; Baggio et al., 2016; Cox et al., 2010; Ostrom, 2015; Villamayor-Tomas & García-López, 2018), forests (Gebreegziabher et al., 2021; Persson & Prowse, 2017) and forest CPRs in particular (Gupta et al., 2020; Gupta & Koontz, 2019; Schusser et al., 2015), very few studies explicitly compare NGO interventions with design principles suggested in commons literature (Barnes et al., 2017; Barnes & van Laerhoven, 2015; Meinzen-Dick et al., 2020). Thus, it is still somewhat uncertain to what extent NGO interventions in forest CPRs align with commons literature. Although there is much work being done on the ground by NGOs, their activities and rationales are poorly reflected in commons literature. This has been attributed to a paucity of case studies, and the difficulty of standardising and aggregating cases that take place in a variety of different contexts (Brass et al., 2018).

1.1 Scientific and social relevance

NGOs are often important actors in these settings, affecting many aspects of life for local communities (Brass et al., 2018; KimDung et al., 2016), though their work is not very well represented in commons literature. This is especially true for the rationales and difficulties that inform their work. Additionally, NGOs may not be aware of the claims made in commons literature about CPR management. In fact, Barnes (2017) showed that while NGOs do implement some design principles, they do so unconsciously. On the other hand, scientific literature does not sufficiently reflect the lessons NGOs have learnt through practice. By attempting to connect the two, the social relevance of this research lies in trying to provide NGOs and other practitioners with ideas in scientific literature to expand their range of activities in managing forest CPRs. These expanded interventions may better enable communities to become more self-sufficient in sustainably managing their forest resources, secure their livelihoods in the long term and conserve the forest resource base. Connecting their interventions explicitly to commons literature may grant NGOs access new funding sources. At the same time, this thesis seeks to contribute to scientific literature by identifying how these principles can be implemented and providing a deeper understanding of the motives and hurdles in applying them.

1.2 Research aim

This thesis thus aims to contribute to understanding an important gap between theory and practice of managing forest commons by directly connecting on-ground cases with principles outlined in scientific literature. It wishes to provide an initial set of practice-based cases connected to sound scientific literature that academics and practitioners alike can use to better understand and plan forest CPR interventions.

To do so, this thesis focuses on the case of the Western Ghats in India to build and analyse a set of case studies which illustrate such on-the-ground work. Thus, it asks the following question:

How do NGO interventions within forest common pool resources in the Western Ghats compare with scientific literature on successful collective action?

1. What are the conditions for successful collective action required to manage forest common pool resources according to scientific literature?
2. What interventions and activities do NGOs employ to achieve their aims within forest commons?
3. What is the rationale underlying these NGO interventions and activities?

Subquestion 1 seeks to identify the conditions scientific literature deems important for effective CPR management. Subquestion 2 then seeks to fully explore NGO interactions to understand how NGOs intervene in forest CPRs. Lastly, Subquestion 3 seeks to reveal the reasoning NGOs follow to implement these activities and provide a deeper layer of understanding the drivers and the challenges in applying design principles that literature may oversee. By comparing the answers of Subquestions 2 and 3 against those of Subquestion 1, this thesis hopes to highlight differences between practical activities and academic literature while checking if they follow similar reasoning when deciding how to help communities.

In order to answer these questions, this thesis employs a descriptive case study analysis, using the case of the Western Ghats in India. Subquestion 1 was addressed by reviewing scientific literature on CPRs and then building a theoretical framework with which to analyse NGO interactions (Section 2). To study NGO activities (Subquestion 2 and 3), this study employed a Theory of Change framework. Finally, to compare NGO interventions and scientific literature and answer the overarching research question, the answers to Subquestion 2 and 3 were coded with the answers to Subquestion 1. The methods used to collect and analyse this data are described in Section 3, followed by the obtained results Section 4. The findings are discussed in Section 5 and the final conclusions are laid out in Section 6.

2. Literature Review and Theoretical Framework

2.1 Literature Review

In order to understand what scientific literature considers important to manage CPRs, it is necessary to critically engage with common property theory. This section gives an overview of CPRs before describing how scientific literature suggests they should be managed.

Forests, water resources, pastures, fishing grounds, etc. are often characterised as common pool resources (CPRs). They usually have a direct role in people's livelihoods (especially in developing countries) and provide indirect ecosystem services such as carbon sequestration or climate regulation (Barnes, 2017; Nunan, 2020; Wright & Andersson, 2013). While CPRs are often renewable resources (that replenish stocks themselves), this process takes time and appropriate conditions (Nunan, 2020). This means that only a limited number of resource units are available for harvest at any given time (high subtractability) if the resource is to be successfully managed, i.e., continue providing resource units at an optimum rate. Combined with the difficulty of preventing users from accessing the resource (high non-excludability), CPRs pose unique governance challenges in avoiding over-exploitation and under- provisioning of the resource base (Agrawal, 2001; Barnes & van Laerhoven, 2015; Cox et al., 2010; Nunan, 2020).

This thesis seeks to critically review the body of literature dedicated to sustainably manage such CPRs. Since the 1980s, it has been argued that resource users can self-govern CPRs under certain conditions. Common property theory offers explanations of how people can work together to manage natural resources that they are dependent on. To this end, researchers have attempted to identify conditions which enable the collective, successful management of CPRs. Among the earlier, influential works are that of Wade (1989), Ostrom (2015), and Baland and Platteau (1996).

Wade used the case of commonly managed irrigation systems in South India to posit 14 conditions that facilitated successful management of these systems. Ostrom (2015) suggested her design principles in her book, *Governing the Commons.* Design principles were defined as essential conditions that help sustain a CPR and ensure that users comply with the rules generation after generation. Analysing a set of 14 cases across irrigation systems, mountain grazing CPRs and forests, she suggested 8 such principles derived from commonalities across all these cases. Finally, Baland and Platteau (1996) compared different types of property regimes to further describe the conditions required for collective management of natural resources.

Others have worked to expand these principles. Agrawal (2001) combined these works to propose 35 enabling conditions for sustainable CPR management. Cox et al. (2010) analysed 91 studies that evaluated cases for Ostrom's principles and suggested expansions of the original conditions. These expansions involved breaking down some of the more general

principles to address specific aspects of commons management. They proposed a total of 11 prinicples. Baggio et al. (2016) then use the expanded set of principles to analyse cases in irrigation, fisheries and forestry. They argue that it is not just the presence of these conditions that matter, but also the configuration of principles (which principles are present together) is key to CPR management.

Some of the recent work on CPRs has focussed on how these principles are utilised in forest CPRs. Baynes et al. (2015) consider cases of community forests in Nepal, Mexico and the Philippines. They find that socio-economic status and gender, tenure rights, governance structures, government support and benefits to the community affect forest CPR management. Persson and Prowse (2017) focussed on community forestry in Cambodia to understand the factors that inhibit effective governance. They discovered that low participation, unfair benefit sharing, high enforcement costs and massive external pressures were to blame. In Ethiopia, Gebreegziabher et al. (2021), found that successfully managed community forests reflected the design principles, but that participation and benefit sharing were causes of concern.

Scientific literature has also focussed on the role of NGOs in such community managed resources. NGOs are considered to be any non-profit or non-governmental organisation active in development, humanitarian, advocacy or civil society sectors. They can work across a range of scales, from international to local (Brass et al., 2018; Mercer, 2002; Oliveira, 2019). In analysing cases of NGOs active in developing countries, Brass et al. (2018) find that participatory development was a major theme among NGO activities and NGOs focus on accountability, citizen representation, policy making, and human rights. Villamayor-Tomas and García-López (2018) even sought to contextualise NGO actions in terms of design principles. Their large-n case study found that social movements defend community rights to the resource, democratise community governance, promote autonomy and local identity ties and knowledge and create nested organisations.

Many more studies focus on the impact of NGOs within forest CPRs. Rahayu et al. (2020) focussed on NGO activities in social forestry in Indonesia and found that NGOs play a key role in helping communities manage forests from helping the organise to framing plans and guiding institutional management. Roy et al. (2018) use the case of social forestry in Bangladesh to illustrate how NGOs build the capacities of forest-dependent groups to improve their livelihoods. KimDung et al. (2016) argue that NGOs in Vietnam function as bridging actors between governments and local communities and tend to work through information spreading and education while refraining from conflict-management and community empowerment. On the other hand, Wright and Andersson (2013), in their research on NGOs in Bolivia, found that NGOs had no discernible effect on community institutions for forest governance.

Meinzen-Dick et al. (2020) highlighted the influence of an NGO as one of the most important actors in managing forest, land and water commons in India. In the Central Himalayas,

Gupta and Koontz (2019) show how NGOs help communities access technical and financial support offered by the government to better manage forest resources. Gupta et al. (2020) compared villages where NGO intervention occurred with those that had no NGO interventions and found that there was a distinct difference in the level of awareness between the two. NGOs mobilised villagers, built their capacities, enabled market engagement and state responsiveness to ensure that the local community could exercise its rights to collectively manage the forest. Barnes (2017), in her PhD thesis, illustrates how NGOs help craft village institutions for forest management, secure livelihoods and enable villagers in Central India to collectively manage forest CPRs by comparing NGO interventions against design principles (Barnes et al., 2017; Barnes & van Laerhoven, 2015). With regards to the Western Ghats, Bawa et al. (2007) explore how an NGO enables communities to form institutions to manage and gain livelihoods from the forest resource.

It is clear that while studies do consider NGO interventions in forest commons, hardly any consider the rationales and difficulties NGOs face in carrying out their activities. Additionally, few describe NGO utilisation of design principles in their activities. This is especially true for cases in the Global South. Very little is known about how NGOs interact with design principles in regions like the Western Ghats, where forest CPRs directly and indirectly support millions of people but are considered threatened ecosystems (Kasturirangan et al., 2013). To address this knowledge gap, this thesis uses the following theoretical framework to analyse NGO actions and design principles.

2.2 Theoretical Framework

The theoretical framework (Figure 1) with which NGO interventions were studied was formulated based on the above literature review. This section first defines the key concepts of the research. The framework is then divided into two parts. The first part describes the principles within commons literature that interventions are compared against. The second discusses how these interventions can be better understood using a Theory of Change approach.

2.2.1 Concept definitions

The forests considered by this study are forested lands (i.e., with a high density of trees) on which local communities are directly dependant (Gupta & Koontz, 2019; Meinzen-Dick et al., 2020). They bear the characteristics of CPRs – high subtractability and high non-excludability (Barnes et al., 2017; Barnes & van Laerhoven, 2015). High subtractability suggests that there are a limited number of resource units at any given time that are not subject to joint use by two or more users. At the same time, high non-excludability means that it is difficult or costly to prevent other users from accessing the resource (Ostrom, 2015).

NGOs are then any non-profit, non-governmental organisation (Brass et al., 2018) active in some aspect of forestry within these spaces. This thesis focuses specifically on local NGOs whose offices are located in the region, employ local residents and who actively engage with and include communities directly in their activities. These NGOs can have different objectives ranging from community environment to research to ecological restoration (classified as classified in this research as Type I, Type II and Type III respectively). NGO interventions are the activities that an NGO undertakes or facilitates within a community (Gupta et al., 2020; Mayne, 2015; Schusser et al., 2015).

Finally, scientific literature on collective action refers to the conditions and principles identified as necessary for a community to organise collective action in a way that sustainably manages common pool resources.

2.2.2 What conditions does scientific literature suggest are necessary for collective action?

At its heart, this thesis seeks to understand how far such NGO interventions align with scientific literature on collective action and common pool resource governance. It does so by employing a theoretical framework that draws heavily from commons literature, in particular Ostrom's design principles (Ostrom, 2015). By comparing NGO interventions against the arguments made by such literature, this study hopes to understand whether interventions employed by NGOs in forest CPRs reflect the suggestions for collective action within scientific literature.

These design principles are "essential elements or conditions that help to account for the success of these institutions in sustaining the CPRs and gaining the compliance of generation after generation of appropriators to the rules in use" (Ostrom, 2015, p.90). Ostrom suggests that a collective action regime that adopts the eight design principles has a higher chance of successfully emerging and being sustained over time. This idea is supported by several large-n metastudies on practice-based cases over the years (Agrawal, 2001; Baggio et al., 2016; Cox et al., 2010; Villamayor-Tomas & García-López, 2018). However, it is important to keep in mind that these principles are not prescriptions but are commonalities derived from case studies of successful commons management (Cox et al., 2010; Villamayor-Tomas & García-López, 2018).

The eight principles are as follows: clear resource boundaries, possible exclusion of outsiders, provision and appropriation rules adapted to site specific conditions, participatory decision making, monitoring of resource by locally-designated agents, presence of conflict-resolution structures, graduated sanctions to prevent rule violations, and external actors who respect common property institutions (Ostrom, 2015).

Cox et al. (2010) expanded on these eight principles to address the critique that they were incomplete. They included principles such as clearly defined resource rights, fair distribution of benefits and burdens, monitoring of both users and the resource condition by

accountable monitors, minimal recognition of local rights to organise by external actors and nested enterprises of the above activities.

Further, Agarwal (2001) attempts to merge these principles along with those described by Wade (1989) and Baland and Platteau (1996) to propose 35 critically enabling conditions for 'organisation, adaptability and sustainability' of CPRs. These conditions highlight potential interventions actors can undertake to promote the sustainable management of CPRs.

Of the 35 conditions, Barnes and van Laerhoven (2015) have identified the ones that are most applicable to NGOs active in forest commons. By conducting interventions that promote these principles, it has been suggested that NGOs can facilitate durable community institutions (Barnes & van Laerhoven, 2015; Villamayor-Tomas & García-López, 2018). Thus, they can ensure that their goals, whether they be environmental conservation or social empowerment, are fulfilled in a way that benefits the forest system in the long term.

This thesis attempts to combine the expanded design principles with the critical conditions identified by Barnes and van Laerhoven (2015) to create a comprehensive framework with which to analyse the potential alignment of NGO interventions with commons literature. The principles taken into consideration, their explanation, and examples are described in Table 1.

These principles can occur in different configurations based on the requirements of the system, which further affects the emergence and durability of collective action (Baggio et al., 2016). This study addresses this point by seeking to identify instances of *co-occurrences*, i.e. when an intervention matches with two or more principles (Baggio et al., 2016).

However, as stated above, this approach takes a static view of the social-ecological system (Baggio et al., 2016; Villamayor-Tomas & García-López, 2018). NGO interventions have been shown to change over time (Barnes & van Laerhoven, 2015). Therefore, this study refrains from drawing concrete causal conclusions.

Table 1: *Explanations and examples of how NGOs can apply design principles (adapted from Agrawal, 2001; Barnes & van Laerhoven, 2015; Cox et al., 2010)*

Design Principles	Explanation	Examples
Harvesting rights	Clearly defined rights of individuals or households to withdraw resource units from the CPR	NGOs could provide low-cost exclusion technology based on context and availability
Boundaries	The physical CPR boundaries must be well defined	NGOs could help with mapping or markers
Locally apt appropriation rules	Appropriation rules restricting time, place, technology, or quantity of resource units are related to local conditions	This can be done by matching harvest restrictions to resource regeneration, easing rule enforcement or framing simple, understandable rules. NGOs may help by providing information and advice
Proportional benefits	The benefits obtained by users from a CPR are proportional to the amount of inputs (labour, material, or money) required	NGOs can help ensure fairness in benefit allocation through advice
Majority participation	Most individuals affected by operational rules can participate in modifying the rules	This can be done through locally devised rules and homogeneity of identities and interests. NGOs can advise and raise awareness.
Accountable monitors	Monitors are present and actively audit CPR conditions and appropriator behaviour. Additionally, these monitors should be users or be accountable to users	NGOs could offer advice on resource monitoring
Graduated sanctions	Users who violate operational rules are sanctioned depending on the seriousness and context of the offense by other users or monitors	NGOs could provide advice on graduated sanctions
Conflict-resolution mechanisms	Users have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials	NGOs could provide conflict resolution support like low cost adjudication or advice on matching local rules with external provisions or external sanctioning institutions.
External recognition of community rights	The rights of appropriators to devise their own institutions are not challenged by external governmental authorities	NGOs may use advocacy and lobbying to ensure that external governments do not undermine local authority
Nested enterprises	All appropriation, provision, enforcement and governance activities are organized in multiple layers of nested enterprises	NGOs can help set up nested advices through advice
Social capital	There are examples of past successful experiences of community forest management	NGOs may be able to help through showcasing previous activities
Appropriate leadership and community capacity	Appropriate leadership (young, familiar with changing external environment, connected to local traditional elite) is necessary to ensure durable CPR governance	NGOs could provide leadership and capacity building trainings

2.2.3 Studying NGO interventions

Before studying how NGO activities align with the design principles described above, it is first necessary to thoroughly understand NGO interventions and the internal and external influences on them. *Rationales* are the reasons why a NGO chooses to pursue a certain intervention. *Difficulties* are external factors or events that hinder the implementation of a given intervention (Barnes, 2017; Gupta & Koontz, 2019). Together, these represent the factors that influence NGO activities.

This thesis further argues that these rationales and difficulties drive how NGOs structure their interventions. Therefore, it is necessary to study NGOs in greater detail. To do so, this study borrows heavily from the Theory of Change. Drawing on the work of Weiss (1997), Theory of Change attempts to causally link the aims of the NGO and the resulting impact of their activities (Mayne, 2017; Stein & Valters, 2012).

The Theory of Change approach can be understood in different ways depending on the purpose for which it is used (Mayne, 2015). One of these is the *narrative* lens, which is used to communicate with the wider public. It is a description of the planning and implementation of the intervention. A second is the *overview* lens, which shows the various steps and rationale that an NGO feels it must follow to achieve the necessary impact (Mayne, 2015; Stein & Valters, 2012). By using both these lenses to analyse different outputs that NGOs produce and comparing their results, this study hopes to thoroughly illustrate the different aspects of NGO interventions.

Further, the Theory of Change divides the desired results of NGO activities into outcomes, outputs and impacts. For the purposes of this study, *activities* are defined as the actions an NGO undertakes within a working area. *Outputs* are the direct goods and services that are provided by the NGO intervention (Mayne, 2015). These could include advising the community, capacity building trainings, providing technical or material support, etc. (Barnes, 2017; Barnes & van Laerhoven, 2015).

Outcomes are the changes in the forest CPR system caused by outputs. To better focus the study, this thesis considers outcomes to be changes in the behaviour of the community (Mayne, 2017). For example, this could be the adoption of sustainable harvest techniques by the community, community leadership or an increase in community incomes. Outcomes can vary in time (Mayne, 2017; Stein & Valters, 2012). Therefore, this thesis accounts for not only current but also past changes and expected changes the NGOs wish to see.

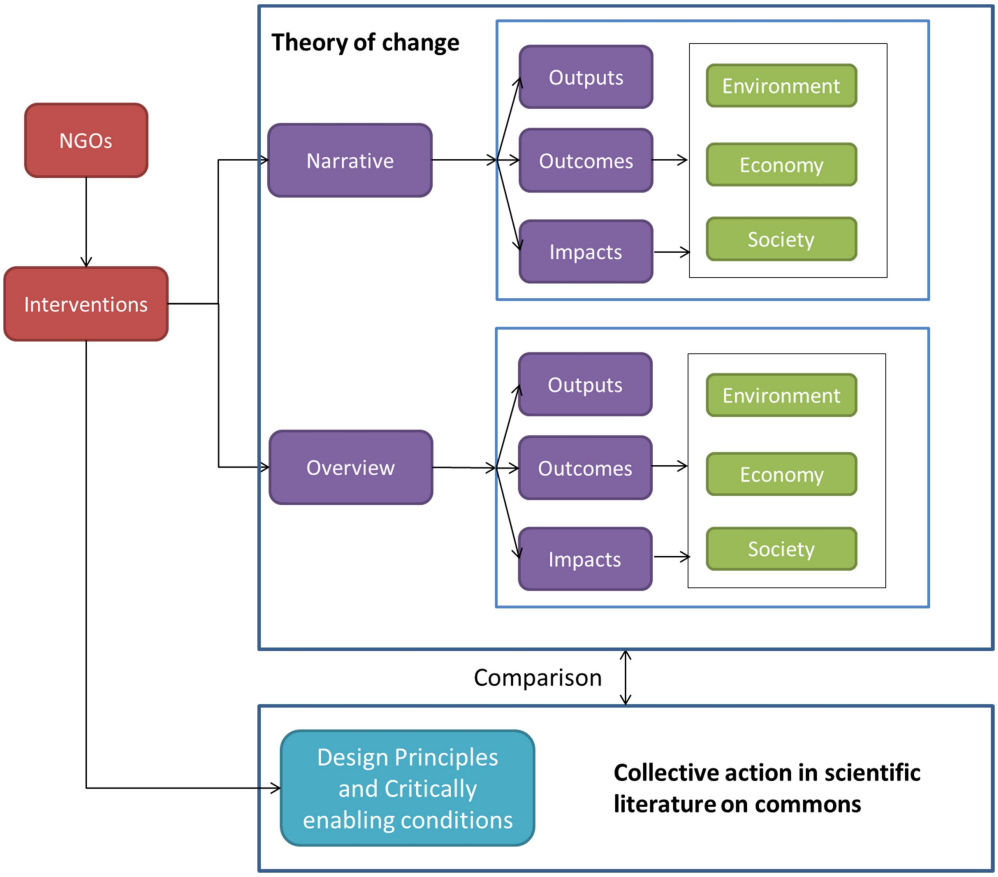
Finally, the systematic changes resulting from the outcomes are known as impacts. *Impacts* are the final system state that the NGO wishes to achieve (Mayne, 2015, 2017; Stein & Valters, 2012). These could be biodiversity conservation to improve the forest resource base, improving community capacity to manage their own resources, or securing community livelihoods, among others.

Any given intervention can have one or more types of outcome and impacts (Mayne, 2015). For example, by imparting knowledge about sustainable harvesting practices for non-timber forest products, NGOs were able to improve community engagement in maintain forest commons (an environmental effect) and improve its financial prospects (a financial effect) (Barnes & van Laerhoven, 2015). In order to capture both the intended and unintended effects of an interventions, this study classifies outcomes and impacts in three different dimensions – the environment, the economy and society (Schusser et al., 2015). *Environmental outcomes and impacts* are those that affect the physical, natural surroundings of the community such as improving forest health. *Economic outcomes and impacts* are those that impact a community financially, like increasing a community's income. Finally, *social outcomes and impacts* are those that alter the social structure and functioning of a community as a whole as well as the smaller groups within it. These include gender empowerment, education, etc. (Schusser et al., 2015).

However, the approach outlined in this section only considers a static view of the system. It is necessary to keep in mind that outcomes vary at different times as, in order to achieve the desired impact, interventions (outputs) are apt to change depending on the stage of the project (Barnes & van Laerhoven, 2015) or due to influences external to the project (Mayne, 2015). Therefore, this study is descriptive as it cannot draw concrete conclusions on the causality of the impacts of these interventions.

An overview of the theoretical framework is given in Figure 1.

Figure 1: *Theoretical framework: Interventions are analysed using Theory of Change and commons literature. For the first, they are analysed through both narrative and overview lenses, each of which is divided into outputs, outcomes and impacts. Outcomes and impacts are then classified into environmental, economic and social. Finally, this analysis is compared against the design principles in commons literature.*



3. Methods

This section describes the methods used. It first describes the study areas before explaining the sampling strategy, followed by the operationalization of the theoretical framework. Finally, it discusses data collection and analysis with a note on ethical considerations.

3.1 Study Area

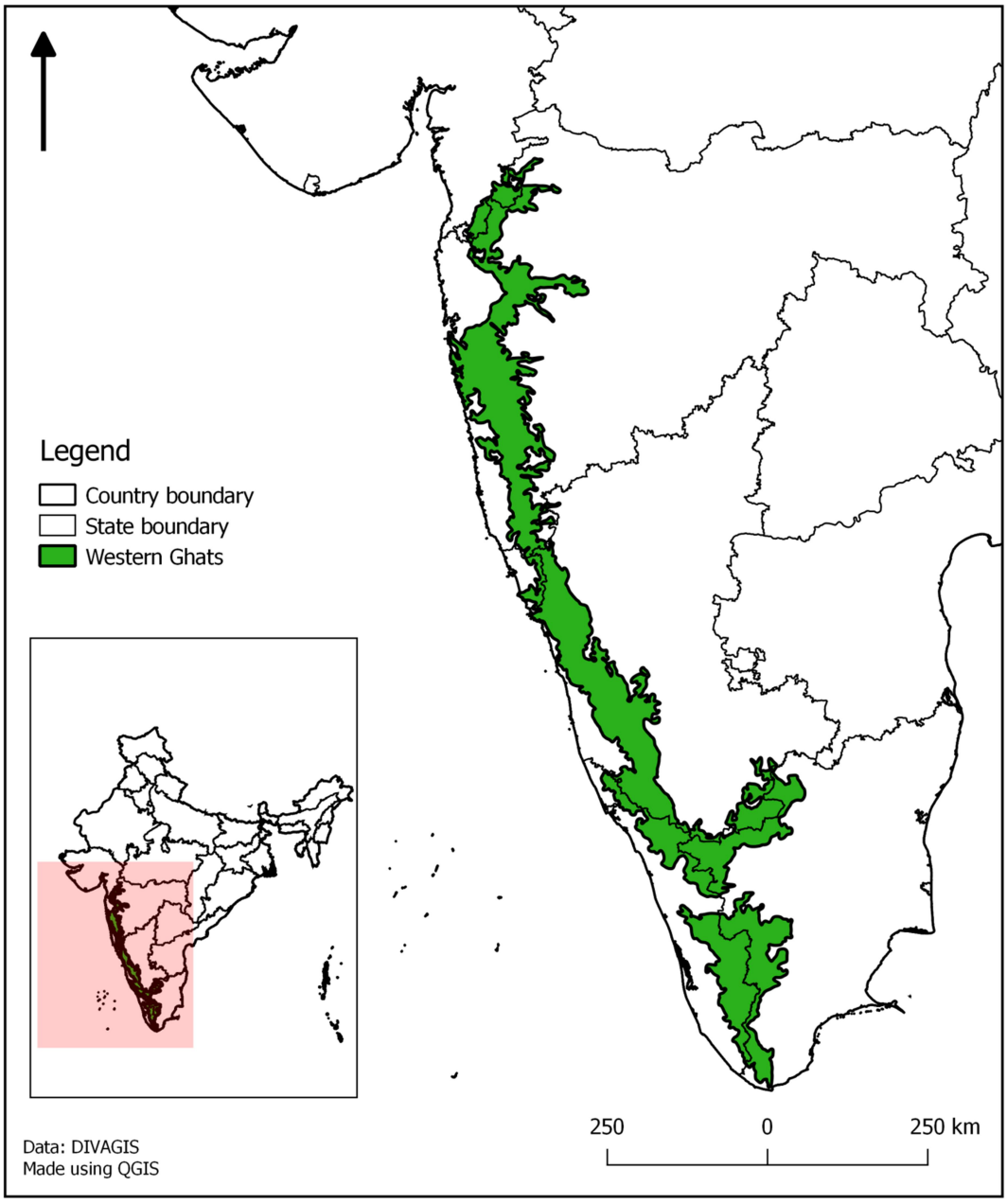
The Western Ghats of India was chosen as the region for study for a few reasons. First, the region represents one of the world's most populated biodiversity hotspots (Bawa et al., 2007; Kasturirangan et al., 2013). The area is home to different communities, ranging from tribal settlements to farming communities to urban areas, many of whom are forest-dependent. These forest-dependent communities are often poor and depend on the forest resource to meet their basic needs (Basavarajaiah et al., 2020; Kasturirangan et al., 2013). This has meant that many NGOs with different aims are active within the region and engage with local communities and forests in some way. However, little is known about their work. Additionally, given that this thesis had to be conducted remotely, my familiarity with the landscapes of the region allowed for deeper insights despite not being personally present in the area.

The Western Ghats is a mountain range (elev. 0-2674 m above mean sea level) that extends in an almost continuous 1600 km band along the south-western edge of Peninsular India. It extends across six states, beginning in Gujarat and passing through Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu (Figure 2). Given its location, the Western Ghats receive the full force of the south-west monsoon from June to September. The season lasts longer in the south of the Ghats (where annual rainfall can exceed 7000mm) than in the north (average annual rainfall of 800mm). The vegetation is dictated by this rainfall pattern along with elevation. Forest types include wet evergreen, high montane, dry evergreen, moist deciduous and dry deciduous climax. With the vast differences in ecosystem types, the Western Ghats is home to a number of endemic flora and fauna, making it a biodiversity hotspot (Kasturirangan et al., 2013). High density vegetation and high rainfall means that the Western Ghats is the watershed for much of Peninsular India (Andresen, 2018). These natural characteristics of the Western Ghats derive mostly from its forests. Thus, it is extremely important to sustainably manage these resources.

At the same time, fifty million people live in the Western Ghat regions, including indigenous populations, farmers, forest and plantation workers, urban dwellers, etc. (Basavarajaiah et al., 2020; Kasturirangan et al., 2013). The forests are often closely knit with agricultural landscapes dominated by traditional smallholder farmers but including, in some areas, coffee and tea plantations (Bawa et al., 2007). Communities living in and around forested areas depend on forests for multiple direct and indirect reasons. Direct benefits from forests include subsistence and livelihood through the collection and sale of non-timber forest

products (NTFPs). Indirect benefits include maintenance of water and soil quality, climate regulation, cultural benefits, etc. (Andresen, 2018; Bawa et al., 2007; Kasturirangan et al., 2013). Given communities' dependence on them, these forest resources often have the characteristics of CPRs. The diversity of ecosystems and cultures along the Western Ghats means that these CPRs may require different types of NGO interventions. Selecting the region as a study site allows this study to compare NGOs across a range of ecological and social settings.

Figure 2: *Map of the Western Ghats, India (data from DIVA-GIS, n.d.)*



However, it is also necessary to understand the legal frameworks that influence forest governance. Forests can be controlled by their respective state Forest Departments or can be private or community-owned. Even when forests are privately owned, they can be accessed by other villagers to harvest NTFPs (Andresen, 2018; Sathayapalan, 2010). However, in government-controlled forests, community access depends on the classification of forest and the laws in force.

In India, there has been a strong trend of devolution of power from the government to communities in forests (Gupta et al., 2020). While colonial policies and earlier laws like the Indian Forest Act, 1927, Wildlife Protection Act, 1972, and Forest Conservation Act, 1980, sought to place forests in the hands of the government, latter policies promoted the inclusion of communities in forest governance (Andresen, 2018; Gupta et al., 2020; Gupta & Koontz, 2019; Sathayapalan, 2010). Policies supporting social forestry like the National Forest Policy, 1988 and the Biological Diversity Act, 2002 as well as those seeking to grant communities the right to organise and govern their own resources (Panchayats Extension to Scheduled Areas Act (PESA), 1996, Forest Rights Act, 2006) came into power. However, since previous rules and regulations are still in force, there is much friction between Forest Departments and forest-dependent communities (Sathayapalan, 2010). It is within this complex and complicated natural, legal and cultural landscape that local NGOs work. The increasing trend of community-managed forests in an ecologically sensitive, culturally diverse area means that it is vital to study the drivers of collective action in these landscapes. Given how NGOs have been shown to have an important role in these spaces (KimDung et al., 2016; Meinzen-Dick et al., 2020), this study area allows for comparison in across different socio-ecological regions that are governed under similar legal frameworks.

3.2 Sampling

This study uses descriptive qualitative case study analysis to understand the impact of NGO intervention on forest commons. The unit of analysis is the NGO themselves.

Ten most-similar cases of local NGOs within the Western Ghats were identified. The conditions to identify the cases were that they contained a) a local NGO active in the region, b) which conducts activities directly related to forestry c) and interacts with local communities d) under the same national context.

Most-similar case design selects cases that are strongly alike, except in factors that can influence NGO activities (Burnham et al., 2008; Gerring, 2004). In forest CPRs, these factors could include the ecology of the region, social characteristics of the community, NGO objectives, etc. (Agrawal, 2001; Barnes, 2017; Gupta & Koontz, 2019). Additionally, this study uses a holistic, multiple case design, i.e. ten cases are examined within their own unique contexts (Gerring, 2004). Such an approach allows for maximal experiential variation while minimising the number of uncontrolled spurious variables (Burnham et al., 2008;

Gerring, 2004). This enables an in-depth exploration and comparison of NGO interventions in different socio-ecological systems under a similar legal context.

As there is no exhaustive list or typology of NGOs available for India (Barnes, 2017; Gupta et al., 2020), a snowball method was used (Bryman, 2012). NGOs were first identified and approached through different local experts to keep the sample as diverse as possible. Thereafter, other NGOs were approached through the initial respondents. Keeping the sample as diverse as possible may increase its representativeness. This is especially important in the Western Ghats case as it is impossible to ensure sample representativeness by probability selection (Bryman, 2012). This method allowed the selection of NGO cases that varied in geographic location (with different socio-ecological factors) as well as in NGO objectives within that location (Bryman, 2012; Burnham et al., 2008). Snowball sampling also allowed for quick trust-building with NGO respondents, enabling the collection of very rich data.

The data collected from these NGOs was assessed using the indicators described in the following section.

3.3 Operationalization

This section operationalizes the theoretical framework for each of the two sections separately. First, it operationalizes the Theory of Change concepts that were used to examine the interventions themselves (Table 2). Two lenses were used - the narrative and the overview. Both were analysed as follows.

Activities undertaken by NGOs and the goods and services they provided - the *outputs* - were recorded. Activities and outputs were combined in one list as it proved difficult to differentiate easily between them in the available data. Then, for each activity, the *outcomes* (on-going or intended changes to the system in terms of the community's behaviour) were detailed. Finally, the overall goals the NGO aspires to within the forest CPR were recorded as the *impacts* of the interventions. These outcomes and impacts were further classified as *environmental* (affecting the physical environment), *economic* (affecting the community's financial status) and *social* (affecting societal structures).

Rationales are the reasons why a NGO chooses to pursue a certain intervention. *Difficulties* are external factors or events that hinder the implementation of a given intervention.

Table 2: *Indicators for analysing interventions and their operationalization*

Concept	Indicators	Explanation
Activities	List of activities undertaken	These include planned or implemented activities facilitated by NGOs within forest CPRs. These can include advice, mapping, training, etc.
Outputs	List of goods and services undertaken	Outputs are the goods and services provided by the intervention. They can include village institutions, maps, co-op stores, etc.
Outcomes	List of changes in community behaviour	Outcomes are the changes in a community's behaviour that result due to outputs. They can have resulted in the past, present or future.
Impacts	List of overall effects the NGO wishes to see	These are the effects that the NGO wishes to have on the whole system and result from the combined effect of all outcomes of an activity.
Classification of outcomes and impacts		In order to capture all intended and unintended effects of an activity, outcomes and impacts are divided into the following:
	Environmental outcomes	Any effect on the physical or natural surroundings of the community as a direct effect of the NGO intervention.
	Economic outcomes	Any effect on the financial situation of the community as a direct effect of the NGO intervention.
	Social outcomes	Any effect on the society of the community as a direct effect of the NGO intervention.
Rationales	List of reasons provided by NGOs for each activity	Rationales provide an explanation for why an NGO chooses to pursue a certain activity.
Difficulties	List of challenges that hinder NGO activities	Difficulties are challenges that NGOs face in the course of implementing an activity.

Once the identified interventions were analysed, the study then considered how well they reflected scientific literature on the governance of CPRs, as described in 2. Literature Review In order to do so, the concepts by which the interventions were coded must be clearly defined. Table 3 describes which how activities, outputs, outcomes or impacts are assigned to which design principle.

Table 3: *Coding concepts for comparing interventions to design principles (adapted from Agrawal, 2001; Barnes & van Laerhoven, 2015; Cox et al., 2010)*

Coding concept	Explanation
Clearly defined harvesting rights	Any activity aimed at helping communities clearly define harvesting rights. This could include training in low cost exclusion technology, advice, etc.
Clearly defined boundaries	Any activity aimed at helping communities clearly define resource boundaries. This could include mapping, recording traditional rights, etc.
Appropriation rules related to local conditions to that restrict time, place, technology, and/or quantity of resource units	Any activity aimed at helping communities frame rules appropriate to local conditions. This could include providing scientific information on resource dynamics and advising the community on framing easily enforceable, simple to understand rules
Benefits proportional to inputs	Any activity aimed at helping communities on ensuring fairness in benefit allocation such as advice
Participation of most individuals	Any activity aimed at facilitating decision-making, participation of all community members in resource management and helping the community align their interests
Presence of monitors accountable to appropriators	Any activity aimed at ensuring a) the presence of monitors and b) ensuring monitor accountability to other users through advice etc.
Graduated sanctions	Any activity aimed at advising communities on or implementing graduated sanctions for users who do not follow rules
Accessible conflict-resolution mechanisms	Any activity aimed at offering low-cost conflict resolution support or matching local rules with existing external rules
External recognition of communities rights	Activities that improve community sovereignty over the forest resource, ensuring external aid in exchange for mutually beneficial activities or external recognition of community rights to organise
Nested enterprises	Activities that promote different yet nested levels of appropriation, provision and enforcement and the involvement of the community at different levels and scales.
Others: Social capital	Activities that NGOs use to build trust with communities or to showcase other locations where such interventions were successful.
Others: Appropriate leadership	Activities aimed at community capacity building including leadership training, skill building etc.

3.4 Data collection

To gather data for such an analysis, NGOs were approached for semi-structured interviews to discuss their interventions in forests (Appendix A). These interviews lasted between 60 and 120 minutes. In order to minimize reporting bias, NGOs were first asked to describe their activities in general before elaborating on their outputs, outcomes and impacts. They were then asked specific questions about activities that may have fulfilled each design principle, providing examples where needed. Interviews were then manually transcribed using oTranscribe (*OTranscribe*, n.d.).

Interview data was complemented by conducting document analysis. For NGOs who had publicly available documentation on their respective websites, this took the form of 5 years' (2015-2020) worth of annual reports. Where annual reports were not available, NGO respondents were solicited for any documentation they could provide. If the amount of available documentation for a particular NGO was low (less than two documents available), interviews were proportionally lengthened in order to collect more data and balance the sample. Thus, NGOs with the least documentation were interviewed longer than NGOs with the most documentation.

3.5 Data Analysis

3.5.1 NGO typology

Given the wide differences between NGOs that emerged during data analysis, it became necessary to create a typology of NGOs to better compare and contrast their interventions. This typology was created by employing inductive reasoning through multiple rounds of data analysis (Bryman, 2012). It was based on secondary NGO descriptors, focussing specifically on NGO's stated objectives (Vakil, 1997). This was done as most NGOs quoted their mandates and aims as reasons for implementing (or not) certain design principles.

Each NGO was then analysed in two parts before the results were combined by type to get the overall picture (Figure 3).

3.5.2 Analysing interventions themselves

3.5.2.1 Using two lenses

Interventions were then analysed using the Theory of Change. Data from the interviews was considered to represent the *overview* Theory of Change, while that from the document analysis represented the *narrative* Theory of Change. As mentioned in Section 2, the narrative lens seeks to describe the planning and implementation of an intervention. Such detailed information was usually available in NGO documentation. On the other hand, the overview lens aims to show the various steps and rationales that NGOs feel are required to achieve the necessary impact (Mayne, 2015; Stein & Valters, 2012). Interview data was used

as NGO respondents could be explicitly asked for the rationales that informed their actions. Combining the two lenses allowed for the triangulation of collected data and led to a deeper understanding of the different approaches NGOs use.

3.5.2.2 Programme areas and programmes

During data analysis, it also became apparent that NGOs were active in different areas with a wide range of interventions. However, most of these activities tended to be similar across NGOs. To increase the ease of comparison, NGO interventions were then classified under various programme areas based on the impacts NGOs wished for them to have. Under these programme areas, most common interventions were chosen as programmes. This was done after multiple rounds of data analysis using inductive reasoning (Bryman, 2012).

3.5.2.2 Outputs, outcomes and impacts

The collected data was then coded with the indicators in Table 2. Activities included all the actions NGOs were or had undertaken within a particular working area. Outputs were represented by the list of goods and services resulting from each activity. Activities and outputs were combined into one list due to difficulties in being able to separate them completely from each other. Then, outcomes of these services and their impacts were identified. Outcomes and impacts were then classified as environmental, economic and societal outcomes to reflect each dimension that may be affected.

Using these results, tables were constructed that listed the outputs, outcomes, and impacts. Based on this data, various graphs were drawn using Microsoft Excel to provide insights into the different rates of NGO adoption of specific programmes and programme areas. This was done by for all ten NGOs as well as each type.

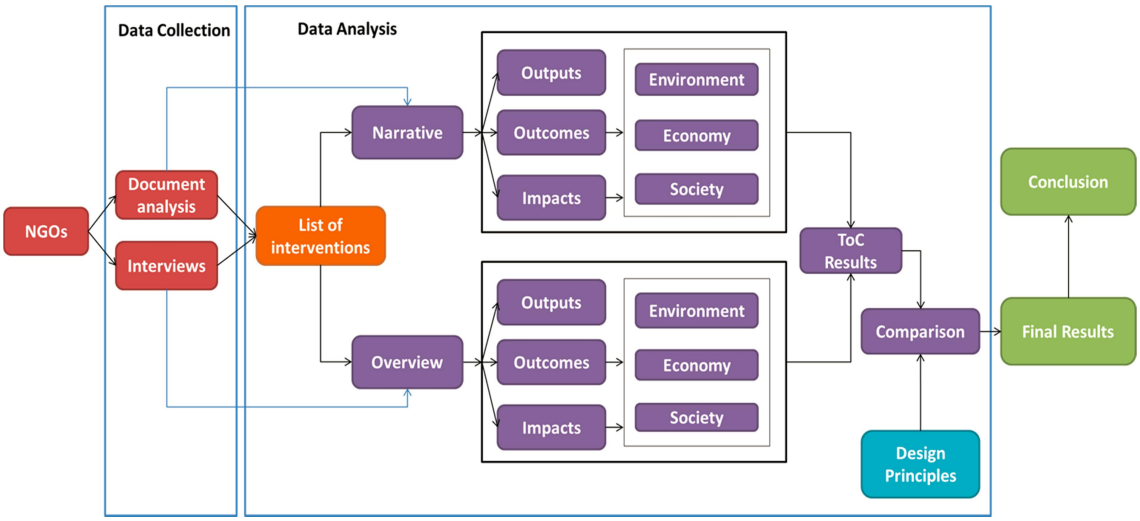
3.5.3 Analysing how interventions relate to scientific literature

In the second part, this thesis seeks to understand whether and how NGOs reflect scientific literature on the governance of CPRs. In order to do so, the interventions described using the Theory of Change were coded and analysed using the indicators in Table 3. These are based on Ostrom's design principles (2015) and Agarwal's enabling conditions (2001). If any aspect of the intervention matched the conditions set out in Table 3, this study considered that design principle to be present for that particular intervention.

If two or more principles occur within the same intervention, they were said to co-occur (Baggio et al., 2016; Ostrom, 2015). These combinations were studied for each type, which were then combined to understand the overarching trends (Baggio et al., 2016). To do so, square grid with the design principles represented in both columns and rows was created. Every time two design principles co-occur, the cell where they meet was cumulatively assigned a point. The more points a cell has, the more the two design principles were likely

to be present together, i.e. a higher rate of co-occurrence. By building such grids, it was possible to identify which conditions commonly co-occur.

Figure 3: *Methodological Framework*



3.6 Validity and Replicability

In order to increase the validity and replicability of this study, multiple steps were taken to reduce bias in sampling and data collection. With regards to sampling, NGOs were first approached through multiple avenues to increase the diversity of the sample. This was done to reduce selection bias that may occur in snowball sampling. The NGOs were also scattered across different geographic locations, with at least one of each type in a different federal state. This also meant that they were active in socio-ecological systems that varied by forest types. By doing so, this study sought to expand its external validity and the generalizability of its findings (Bryman, 2012; Burnham et al., 2008; Gerring, 2004).

With data collection, interviews were carefully framed to minimize any potential bias. This was done by balancing questions about an NGO's activities against questions on their use of design principles. Additionally, semi-structured interviews allowed for minimal interference from the interviewer. Finally, triangulation was used to further reduce bias by considering both interview data and available documentation. These measures were used to increase the replicability of these findings (Bryman, 2012; Burnham et al., 2008; Gerring, 2004).

3.7 Ethical considerations

In order to fulfil the ethical considerations of such analysis, the willing verbal consent of the participants was acquired before conducting and recording the interviews after informing them of the broad aims of the study. Verbal consent was chosen over written consent as it proved difficult to coordinate written consent due to resource constraints. All personal data related to names and exact physical location was anonymised. In order to further protect privacy, the raw data collected from interviews was and will only be available to the student

and the supervisor. All data was stored on a password protected laptop and shared only through university email. For all ethical considerations, this thesis followed university policy and relevant laws on that particular subject.

4. Results

This section lays out the results of the data analysis. First, it addresses the typology followed by a description of NGO interventions according to Theory of Change. Finally, it describes how these interventions relate to design principles.

4.1 Typology

Through inductive reasoning over multiple rounds of data analysis, NGOs were classified into three types based on their professed aims and objectives (Table 4). These types were NGOs who focussed on social aspects of development (Type I – NGOs 1-3), NGOs who focussed on research (Type II – NGOs 4-6) and NGOs who were focussed on environment restoration and/or wildlife conservation (Type III – NGOs 7-10).

It must be recognized that there is some overlap in this typology. However, this approach was used as NGOs often stated during interviews that their mandate and aims guided their interventions and thus, the design principles they used.

Table 4: *Typology of NGOs*

Type	NGOs	Objectives
Type I	NGOs 1-3	NGOs that are focussed mostly on improving community's quality of life.
Type II	NGOs 4-6	NGOs that are primarily concerned with research into the environment and local people there.
Type II	NGOs 7-10	NGOS that work towards improving the quality of the environment.

4.2 How do NGOs intervene in forest commons?

This section is structured as follows: first, the overview presents programme areas and programmes that NGOs commonly employ. Then, a detailed description of outputs, outcomes and impacts is given per type of NGO.

4.2.1 Overview

4.2.1.1 Differences between Narrative and Overview lenses

This thesis sought to analyse the collected data with two lenses – the narrative and overview. This was done to triangulate data while allowing for comparison between documentary and interview data. As can be seen below, it was found that there is little difference between the two lenses with regards to interventions NGOs reported. These differences were only slightly starker in the case of design principles NGOs employed. The implications of this finding are discussed in Section 5.1 Reflection on results

4.2.1.2 Programme areas

First, 13 programme areas were identified, through inductive reasoning (see Section 3.5.2.2 *Programme areas and programmes*). These were based on the spheres under which different NGOs undertook various programmes. NGO interventions were then classified into programmes under these programme areas. A summary of NGOs active under each programme area can be seen in Figure 4.

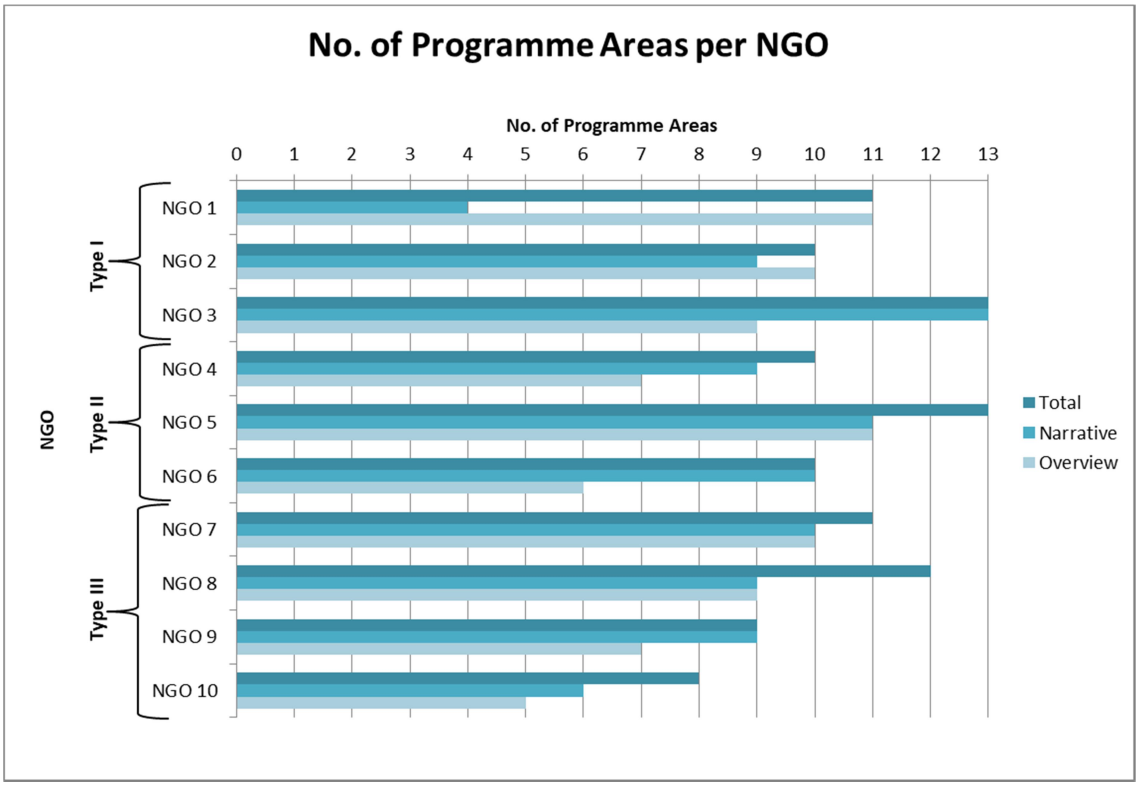
Figure 4: *NGOs active in each Programme Area (green ticks indicate presence)*

			Biodiversity Management	Alternate Livelihoods	Tenure Interventions	Capacity Building	Awareness Building	Advocacy	Communication	Health	Climate Change	Networking	Funding	Watershed Management	Research
Type I	NGO 1	**Total**	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
		Narrative		✓		✓	✓	✓							
		Overview	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
	NGO 2	**Total**	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓
		Narrative	✓	✓	✓	✓	✓	✓		✓		✓			✓
		Overview	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓
	NGO 3	**Total**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Narrative	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Overview	✓	✓	✓	✓			✓	✓			✓	✓	✓
Type II	NGO 4	**Total**	✓	✓	✓	✓	✓	✓	✓		✓		✓		✓
		Narrative	✓	✓	✓		✓	✓	✓		✓		✓		✓
		Overview	✓	✓	✓	✓		✓	✓						✓
	NGO 5	**Total**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Narrative	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
		Overview	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓
	NGO 6	**Total**	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓
		Narrative	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓
		Overview	✓			✓	✓	✓		✓					✓
Type III	NGO 7	**Total**	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
		Narrative	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	
		Overview	✓	✓		✓		✓	✓	✓		✓	✓	✓	✓
	NGO 8	**Total**	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Narrative	✓			✓	✓		✓	✓	✓		✓	✓	✓
		Overview	✓	✓		✓		✓	✓		✓	✓	✓		✓
	NGO 9	**Total**	✓	✓		✓	✓	✓		✓		✓	✓		✓
		Narrative	✓	✓		✓	✓	✓		✓		✓	✓		✓
		Overview	✓	✓		✓	✓	✓		✓					✓
	NGO 10	**Total**	✓	✓		✓	✓	✓		✓			✓		✓
		Narrative	✓	✓		✓	✓			✓					✓
		Overview	✓	✓				✓					✓		✓

Based on this data, the graphs in Figure 5 and Figure 6 were derived. When considering individual NGOs (Figure 5), it can be seen that NGO 3 and 5 are active in all programme

areas. They are followed by NGO 8 (12 programme areas) and NGO 1 and 7 (11 programme areas each). Many NGOs are active in 10 programme areas, including NGOs 2, 4, 6. NGO 9 is active in 9 areas and NGO 10 is active in the least number of areas (8).

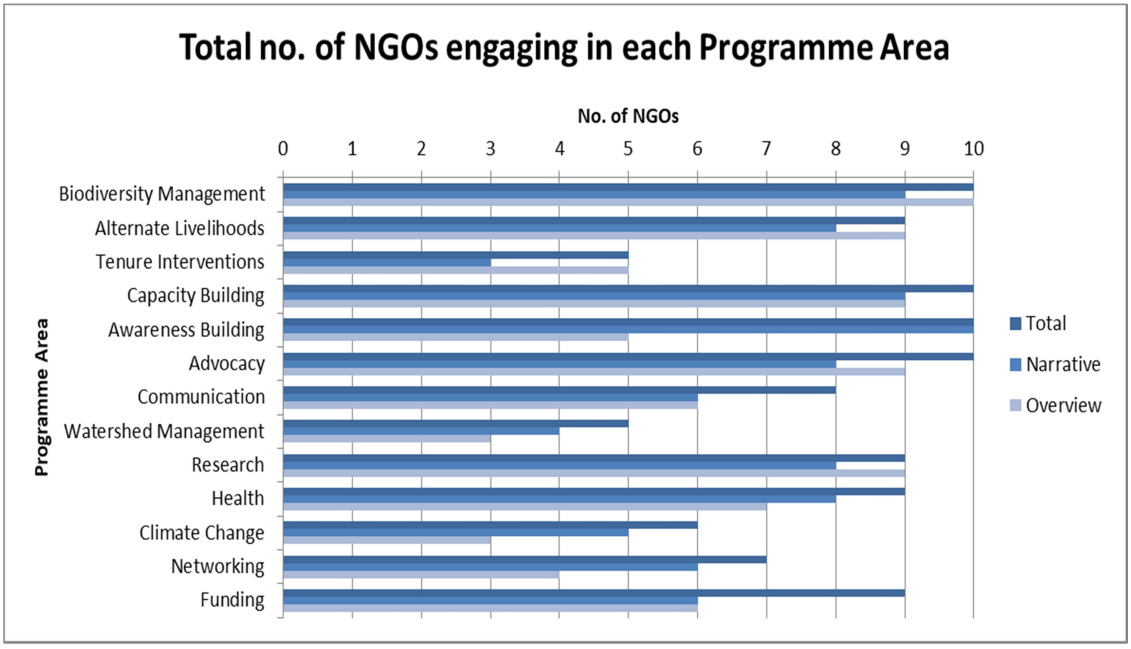
Figure 5: *No. of Programme Areas per NGO*



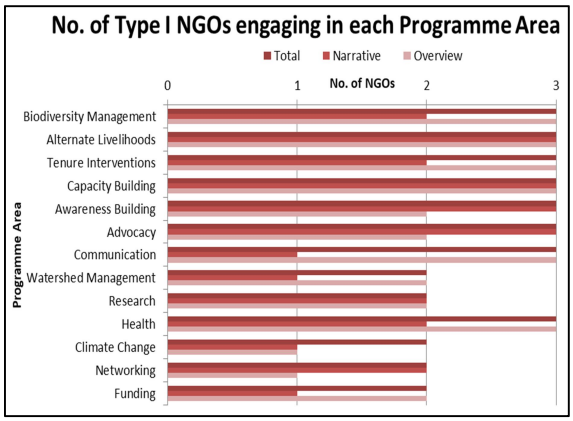
Considering programme areas (Figure 6), it is clear that all NGOs are active in Biodiversity Management, Capacity and Awareness Building, and Advocacy. Other popular programme areas include Alternative Livelihoods, Research, Health interventions and Funding which were undertaken by 9 NGOs each. Communication activities were carried out by 8 NGOs. Interventions that were not as popular included Networking (7 NGOs) and Climate Change (6 NGOs). The programme areas in which the least number of NGOs were active were Tenure Interventions and Water Management (5 NGOs each). However, it is clear that at least half of all NGOs had programmes under any given programme area.

A further description of programme areas and activities under them are mentioned below.

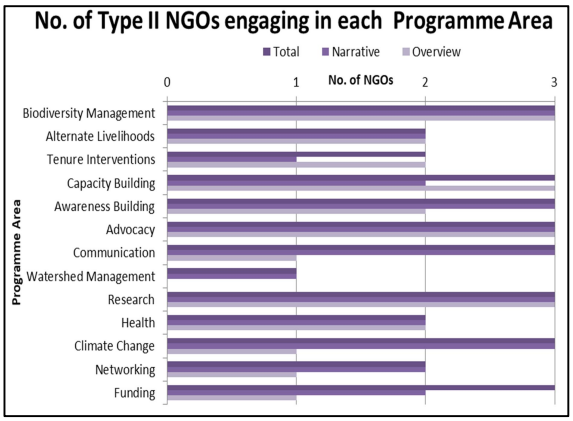
Figure 6: *Total number of NGOs engaging in each Programme Area*



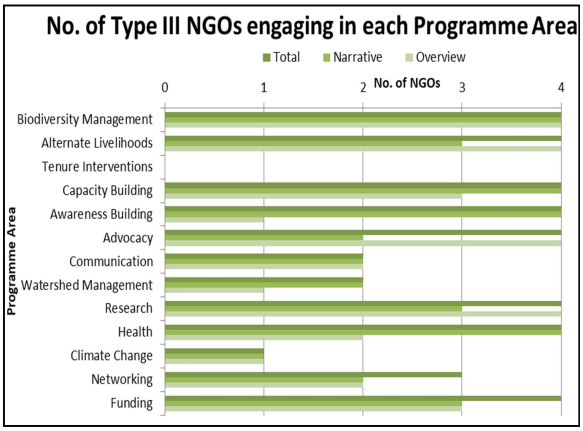
(a)



(b)



(c)



(d)

4.2.1.3. Programmes

The different programmes NGOs implemented under each programme area are shown in Figure 7, with a graphical representation in Figures 8-11.

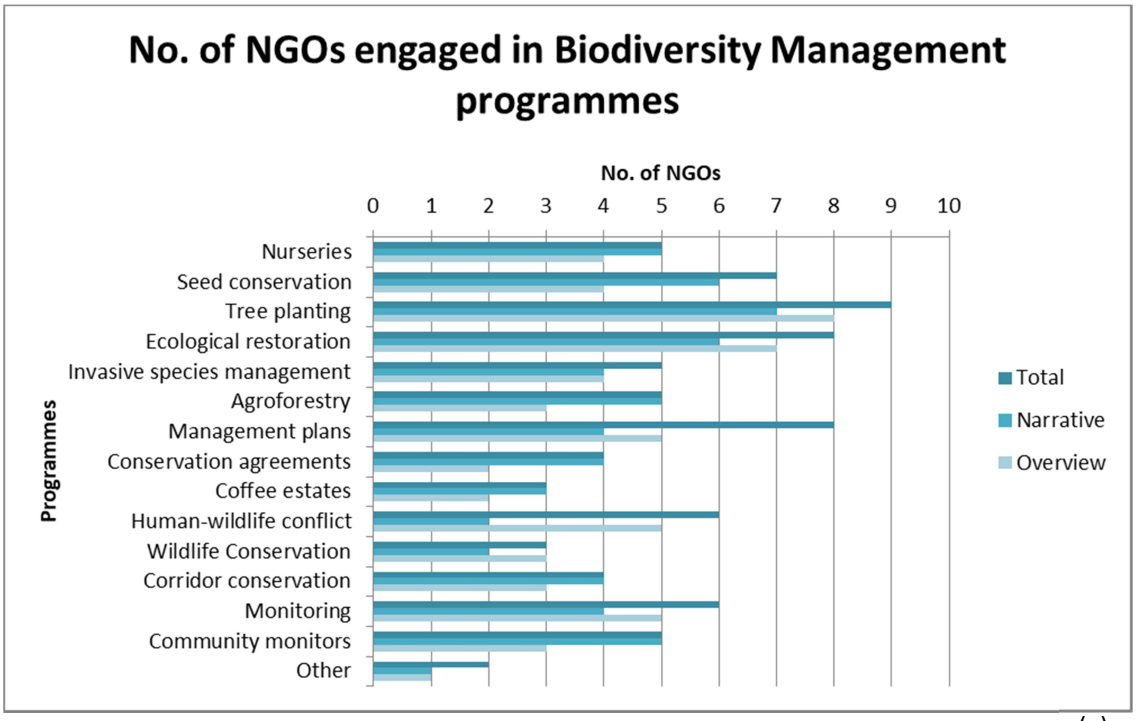
Figure 7: *Programmes per NGO (green ticks indicate presence)*

		Biodiversity Management															Alternate Livelihoods										Tenure Interventions			Capacity Building				
		Nurseries	Seed conservation	Tree planting	Ecological restoration	Invasive species management	Agroforestry	Management Plans	Conservation agreements	Coffee estates	Human wildlife conflict management	Wildlife Conservation	Corridor conservation	Monitoring	Community monitors	General	Agriculture	NTFP collection and value addition	Marketing	Farmer Producer Organisation	Ecotourism	Lantana furniture	MGNERGA	Others	Payment for Ecosystem services		Claims Filing	Mapping	Others	Institution strengthening	Village Savings	Gender Equality	Others
Type I	NGO 1			✓	✓	✓		✓										✓	✓	✓	✓		✓		✓					✓	✓		✓
	NGO 2		✓	✓				✓									✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓
	NGO 3	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓	✓	✓	✓
Type II	NGO 4		✓			✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		✓	✓	✓	✓		✓	✓
	NGO 5	✓	✓	✓	✓		✓	✓			✓						✓	✓	✓	✓	✓	✓			✓		✓	✓		✓		✓	✓
	NGO 6	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓															✓	✓	✓	✓
Type III	NGO 7	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓		✓					✓	✓		✓					✓	✓	✓	✓
	NGO 8	✓	✓	✓	✓	✓		✓		✓	✓			✓											✓								✓
	NGO 9			✓	✓				✓			✓		✓	✓		✓	✓	✓	✓		✓			✓								✓
	NGO 10			✓	✓		✓	✓	✓			✓	✓			✓	✓	✓	✓	✓		✓			✓	✓						✓	✓

		Awareness Building				Advocacy			Communication			Watershed Management		Research		Health				Climate Change			Networking		Funding			
		Awareness building	Conservation education	Citizen Science		Policy comments	Lobbying/Protesting	Liaising with Government	Traditional Knowledge	Trust building		Watershed Management		Research		Nutrition and medicine	Improving health	Alternate energy/materials		Disaster management	Climate action		Networking		Providing funds	Fund raising		
Type I	NGO 1	✓					✓	✓	✓			✓				✓					✓					✓		
	NGO 2	✓	✓			✓	✓	✓	✓	✓				✓		✓							✓					
	NGO 3	✓	✓	✓				✓	✓	✓		✓		✓		✓	✓	✓		✓	✓		✓		✓	✓		
Type II	NGO 4	✓	✓	✓		✓		✓	✓					✓							✓				✓			
	NGO 5	✓	✓	✓				✓	✓			✓		✓		✓	✓	✓		✓	✓		✓			✓		
	NGO 6	✓	✓	✓				✓		✓				✓				✓			✓		✓		✓			
Type III	NGO 7	✓	✓					✓	✓	✓		✓		✓				✓					✓		✓	✓		
	NGO 8	✓	✓					✓	✓			✓		✓		✓				✓			✓		✓	✓		
	NGO 9	✓	✓	✓				✓						✓			✓						✓			✓		
	NGO 10	✓	✓			✓								✓		✓										✓		

Biodiversity Management had the widest range of programmes (Figure 8). These programmes sought to improve the local natural environment and build community capacity to manage the forest resource. Most NGOs had activities related to tree plantation (9 NGOs), ecological restoration (8 NGOs) and management plans (8 NGOs). The least favoured programmes were conservation agreements (4 NGOs), working with coffee estates (4 NGOs) as well as wildlife and corridor conservation (3 and 4 NGOs respectively). Only 2 NGOs had activities that fell outside of the programmes identified.

Figure 8: *Number of NGOs engaged in Biodiversity Management programmes*



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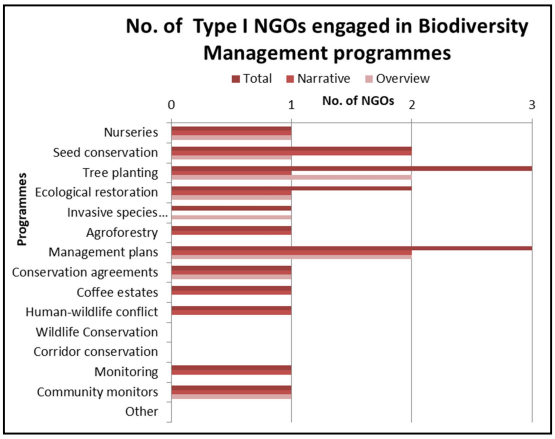

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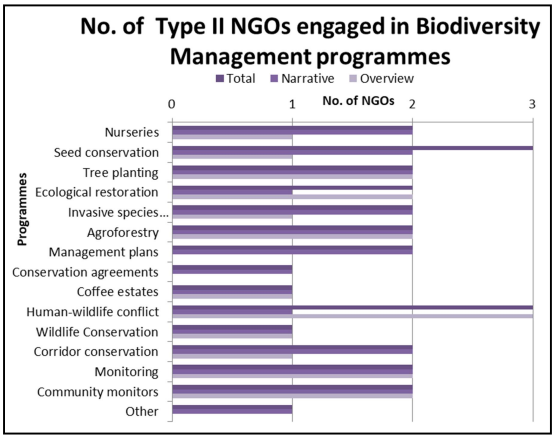

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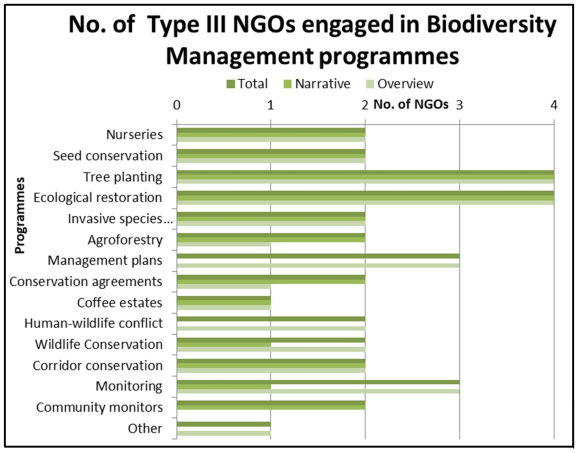

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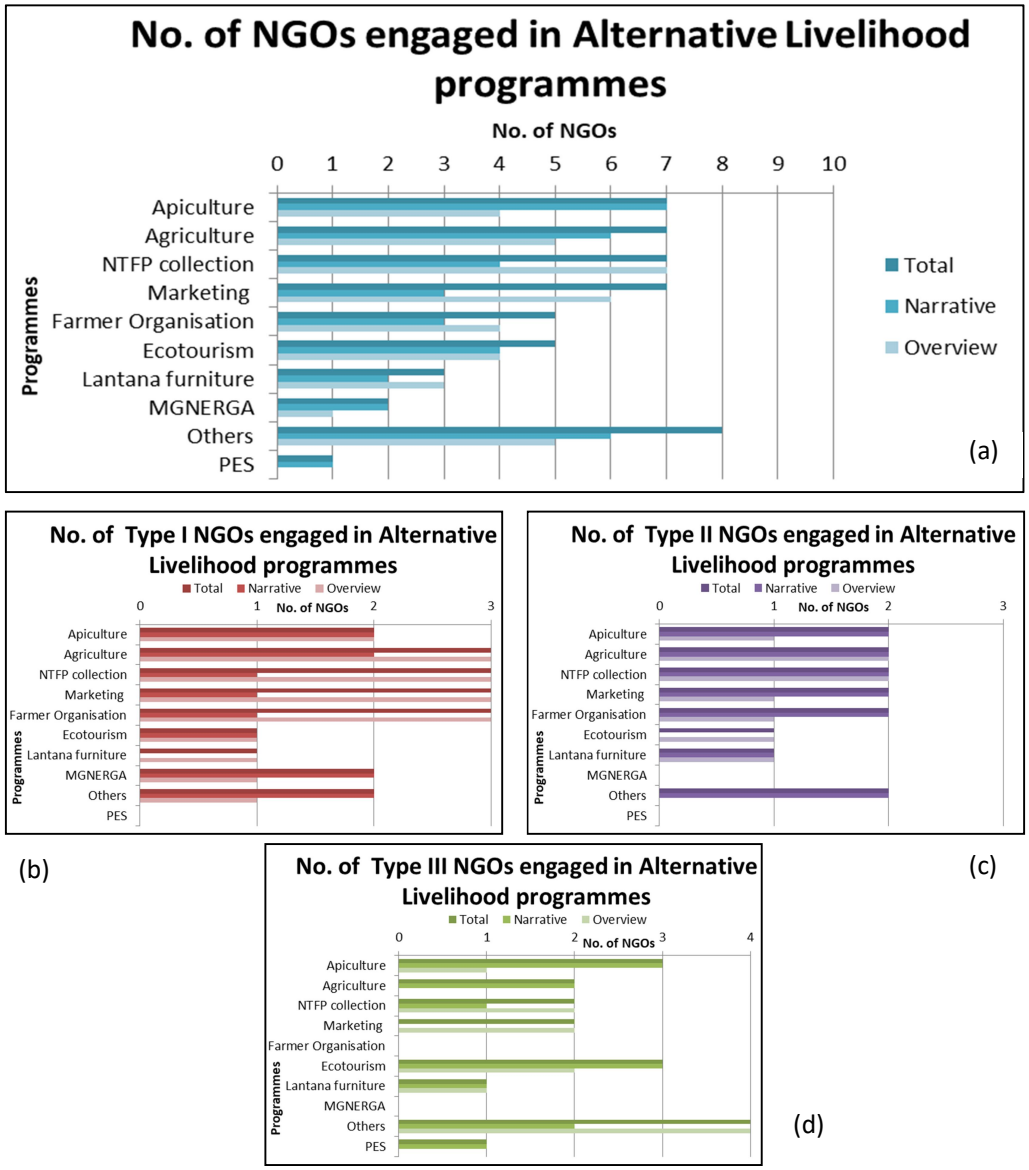
Under Alternative Livelihoods (Figure 9), NGOs attempted to promote activities and train communities in ways that would increase their income and offer them more livelihood options with only positive or neutral effects on the local environment. Most NGOs preferred a wide range of capacity and skill building activities (8 NGOs), from trainings on carpentry or handicrafts to documentation support. Many NGOs also promoted apiculture, agriculture, NTFP collection and value addition, and marketing (7 NGOs). However, only 3 NGOs had activities to promote *Lantana* furniture making[1]. Only 2 NGOs attempted to implement MGNERGA[2] and other government schemes and only 1 NGO attempted payment for ecosystem services schemes.

Figure 9: *Number of NGOs engaged in Alternative Livelihood programmes*



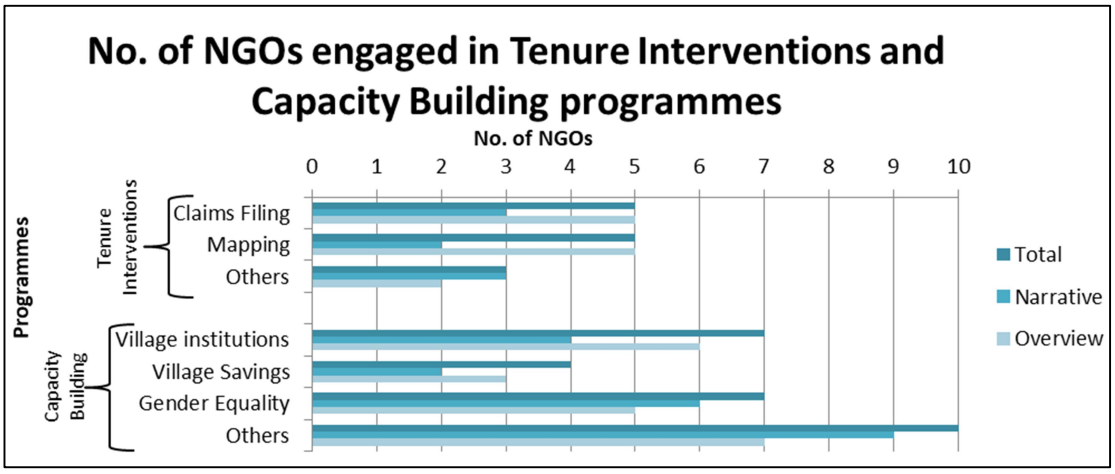
[1] *Lantana camara* is an invasive weed and encouraging local communities to make furniture out of it serves dual purposes of invasive species management and community income generation

[2] MGNERGA is a government employment guarantee scheme that provides 100 days of employment to the rural poor

Tenure Interventions, which help the community to gain rights over the forest resource, were one of the least popular programme areas (Figure 10). All NGOs interested in this programme area focussed on filing claims under the Forest Rights Act, 2006 (FRA) or building community capacity to do so and mapping the resource. Only 3 NGOs had activities outside these, which included devising management plans or liaising with government officials.

On the other hand, almost all NGOs had some sort of Capacity Building programme (Figure 10). These activities were aimed at improving a community's ability in various ways, from natural resource management to livelihood options. Apart from general activities (10 NGOs), NGOs also focussed specifically on strengthening village institutions (7 NGOs), improving gender equality (7 NGOs), and promoting village savings (4 NGOs).

Figure 10: *Number of NGOs engaged in Tenure Interventions and Capacity Building programmes*



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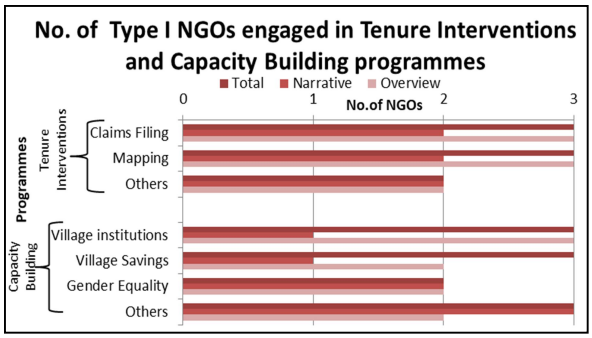

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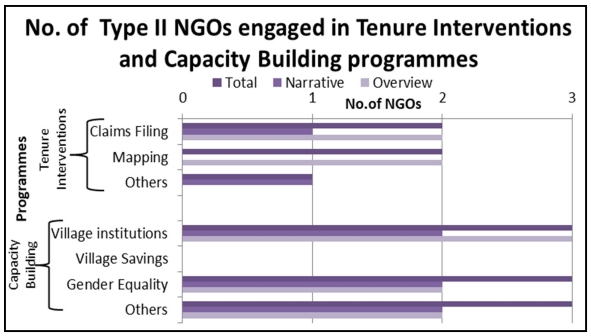

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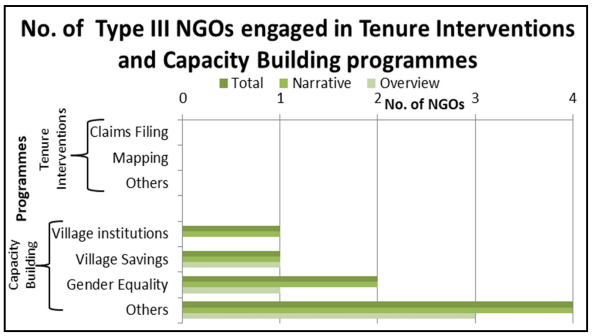

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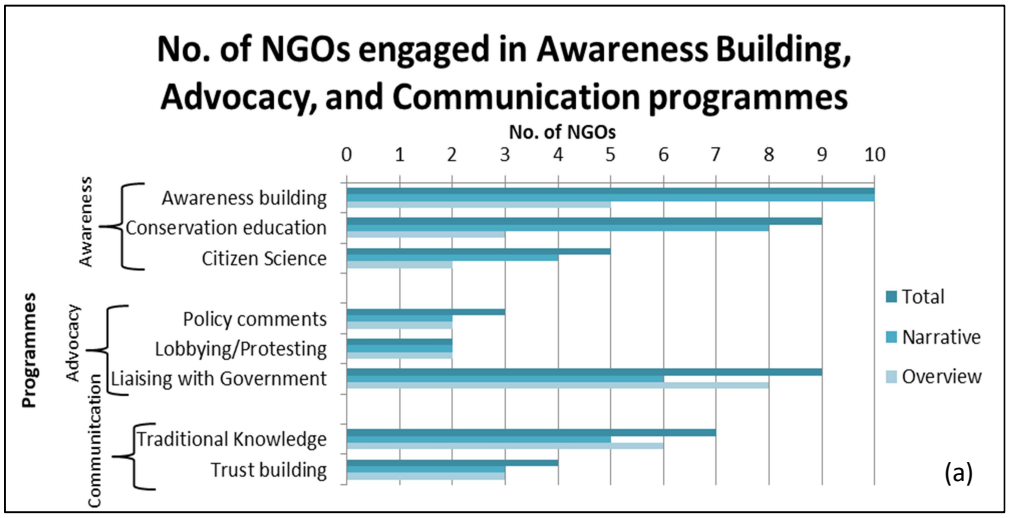
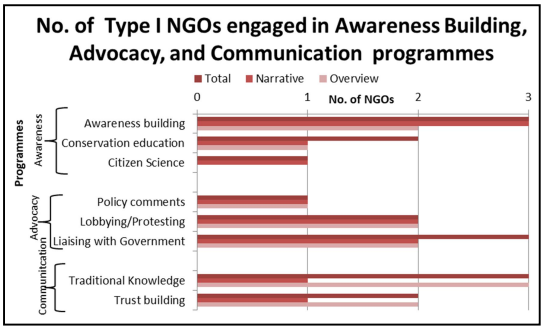
NGOs use Awareness Building, Advocacy and Communication to increase support for their objectives and achievements across a wide range of stakeholders (Figure 11). Awareness building activities (10 NGOs) are directed at community members, general public or government officials while Conservation education (9 NGOs) focuses on increasing knowledge of school and university students. Citizen Science (5 NGOs) seeks to include surrounding stakeholders in generating scientific data to monitor the resource. NGOs employ Advocacy measures to drum up support among governmental officers and departments. While they can do so through policy comments (3 NGOs) or lobbying (2 NGOs), most NGOs prefer to directly interact and liaise with local government personnel. Finally, NGO activities under Communication attempts to build a trust-based relationship between NGOs and the local community. This is usually done through promoting a community's traditional knowledge (7 NGOs) or through a variety of other trust building actions (4 NGOs).

Figure 11: *Number of NGOs engaged in Awareness Buildings, Advocacy and Communication programmes*





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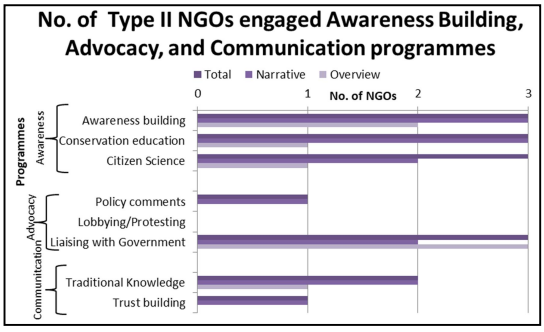

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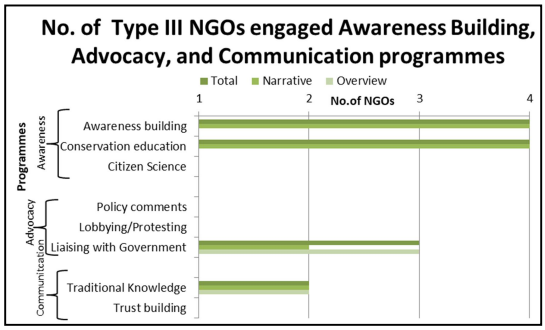

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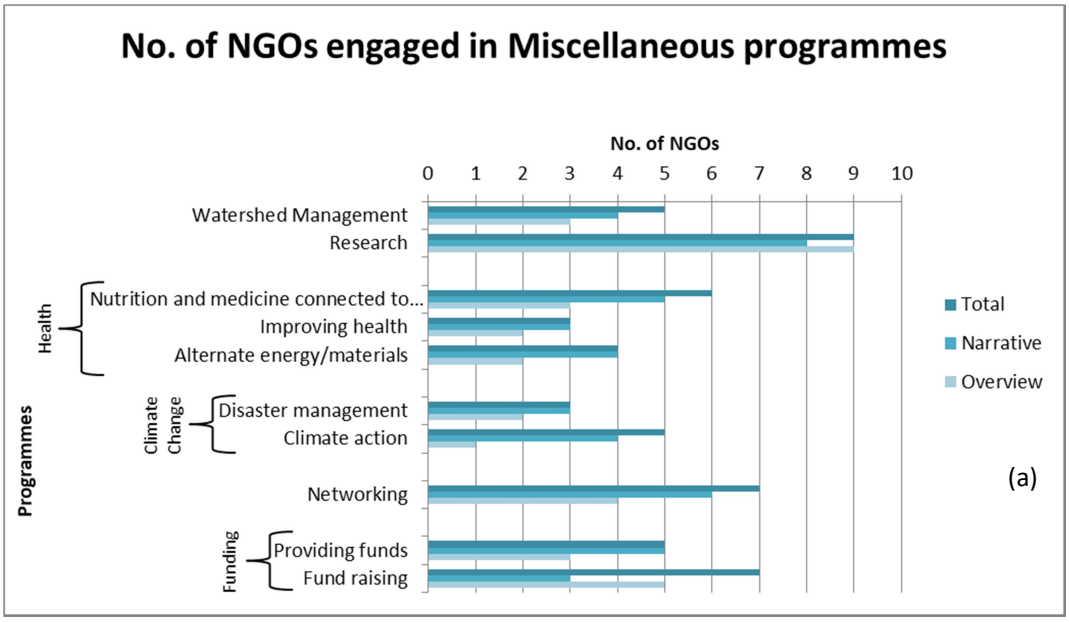
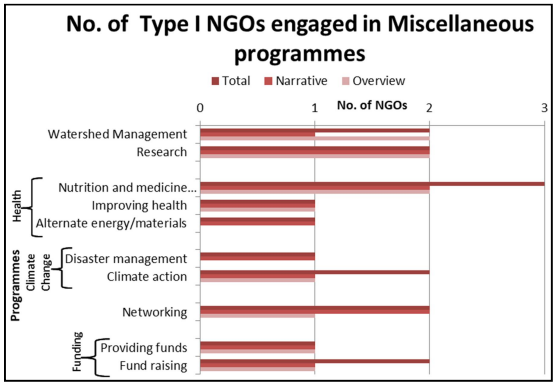
Apart from these programme areas, NGOs are also active in Health, Climate Change and Funding (Figure 12). Under Health, NGOs undertake activities to improve the wellbeing of their communities. Programmes include promoting nutrition and medicine embedded in local biodiversity (6 NGOs), providing alternative materials and energy sources (4 NGOs) and miscellaneous activities related to improving the community's health (3 NGOs). Under Climate Change, NGOs attempt to help communities to adapt to changing climates while reducing their emissions. They promote climate action (5 NGOs) and help in disaster management (3 NGOs). For Funding, NGOs either provide funding to communities for a variety of reasons, from education and research to employment or fund-raising for their activities. 5 NGOs mentioned that they provide the community some form of funding while 7 NGOs mentioned that they raise funds.

Three programme areas – Watershed Management, Research and Networking – had eponymous programmes (Figure 12). In Watershed Management, NGOs attempt to build community capacity and improve local water sources, often connected to nearby forests. For Research, NGOs generate scientific data on communities and the local environment. Finally, in Networking, NGOs try to build networks that link different stakeholders – NGOs, communities, local governments and the general public – at different levels and scales to better mobilise and share information and resources.

The following sections describe the outputs, outcomes and impacts of these programmes in greater detail.

Figure 12: *Number of NGOs engaged in Miscellaneous Programmes (Watershed Management, Research, Health, Climate Change, Networking, Funding)*





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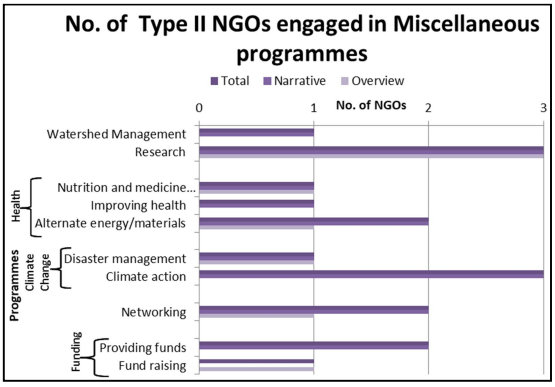

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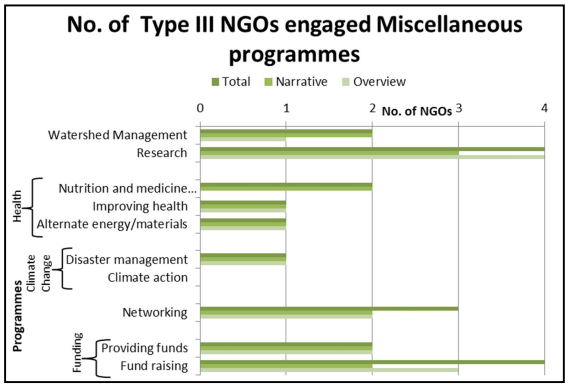

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4.2.2 Type I NGO interventions – outputs, outcomes and impacts

As seen in the preceding figures (Figure 6b), all Type I NGOs are active in a high number of programme areas including Biodiversity Management, Alternate Livelihoods, Tenure Interventions, Capacity Building, Awareness Building, Advocacy, Communication and Health. At least two NGOs out of the three were active in the other areas (Watershed Management, Research, Climate Change, Networking and Funding). This section describes the outputs, outcomes and impacts of interventions under these areas for each NGO (Table 5, with a more detailed table provided in Appendix B1).

Common outputs across all programme areas included trainings, exposure visits, village discussions, framing management plans and rules, interactions with government officials, and outreach activities like festivals, flyers, etc. Additionally, NGOs offered communities technical support by providing equipment and infrastructure and/or documentation and funding.

The outcomes of these activities highlighted the change in community behaviour. They involved community capacity building and/or skill development, increasing stakeholder awareness, enabling community biodiversity management and sustainable harvests, creating stakeholder communication channels for greater interaction and increasing community incomes**.**

Certain impacts were also common across all Type I NGOs. Environmental impacts were most commonly biodiversity conservation, and community biodiversity management and ecological security. The major economic impact was securing community livelihoods and financial security. Finally, social impacts were the most varied and ranged from increasing community sovereignty and rights over the resource, strengthening their governance process to improving community health.

NGOs also provided some reasoning behind their approaches. In their working areas, communities were often highly dependent on forests for their livelihoods. However, communities faced exploitation and eviction, had little alternative sources of income that suited their aspirations and were often deeply divided internally. NGOs believed in interventions that would empower marginalised sections within these communities, increase social cohesion and increase the community's willingness to manage the resource. NGOs also faced difficulties, mostly related to local politics, friction with the Forest Department and other government agencies and reluctance from community members.

It is interesting to take a closer look at NGO interventions under each programme area. In Biodiversity Management, NGOs also undertook research and carried out ecological restoration activities like tree planting and weed removal (Figure 8b). They attempted to foster community networks for better information and resource sharing and wished to reduce human-wildlife conflict while increasing local food sovereignty, community health, and improving community resource management.

For Alternative Livelihoods, NGOs were most active in agriculture, NTFP collection and value addition, marketing, and farmer producer organisations (Figure 9b). Outcomes and impacts were focussed on building community capacity and skills to empower them, providing communities financial security and offering alternative employment opportunities.

NGOs were mostly interested in filing claims and mapping for Tenure Interventions. They were also very active in Capacity Building programs (Figure 10b). Outputs included forming village institutions, and filing individual and community claims over the forest resource under the Forest Rights Act, 2006. The outcomes generally increased participation of marginalised groups, the formation of democratic village institutions, community leadership, and governmental recognition of community rights over the forest resource. These activities also had unique social impacts in securing community rights over the forest, increasing social cohesion, understanding the community's resource base and strengthening community governance processes.

Under programme areas that sought to communicate with stakeholders, NGOs focussed on awareness building, liaising with the government and promoting community's traditional knowledge (Figure 11b). NGOs used outreach materials, school programmes and monitoring apps to increase stakeholder participation, community self-confidence and awareness with the aim of strengthening governance processes and integrating local knowledge into scientific research. They also held consultations, commented on policies and provided communities with legal help while taking steps to include local government officials in community processes. This was done to increase stakeholder consensus, build community awareness and enable communities to resist forceful eviction in an attempt to reduce mistrust between communities and the government. Finally, Communication interventions sought to share information with the community through various mediums so as to conserve their traditional knowledge while building trust between them and the NGO.

All three NGOs were interested in Health programmes, especially health and nutrition connected to biodiversity. They prompted communities to grow local food and medicinal species to improve community health. NGOs were less interested in the other programme areas (Figure 12b). Watershed Management interventions mostly focussed on increasing community capacity to manage water resource and improving community health. Research employed scientific methods to generate information on the resource base, which they then shared with the community in the hopes of enabling sustainable management. Under Climate Change, NGOs attempted to improve local disaster management and encouraged communities to adopt sustainable practices as a buffer against climatic vagaries. In Networking, NGOs sought to build community networks to share information and resources and enable community action. Finally, NGOs funded communities to pursue health interventions or higher education, thus contributing to their empowerment. These funds were raised by approaching various donors.

Table 5: *Type I NGOs - outputs, outcomes, impacts (see Appendix B1 for more details)*

Environmental	Economic	Social

Programmes	Activities/Outputs	Outcomes	Impacts
Biodiversity Management			
Nurseries, Seed conservation	Nurseries, Raise saplings, Training, Exposure visits, Seed bank, Seed exchange programmes, Festivals, Discussions, Demonstrations	Capacity building of forest officials, Farmer networks, Celebrates local biodiversity, Community access to forest products, Community income	Biodiversity conservation, Community conservation, Local food sovereignty, Community health, Community livelihood
Tree planting, Eco-Restoration, Coffee estates, Agroforestry, Invasive species	Planting saplings/ seeds, Leveraging Government schemes, Wetland & Spring restoration′ Revival of fallow lands, Weed removal, Research	Community income, Farmers grow cash crops, Understand the environment	Biodiversity conservation, Ensure constant provision of ecosystem services, Reduce human-animal conflict, Community livelihood, Improve crop production
Monitoring, Community Stewards	Trainings, Survey , Equipment provision, Community monitors, Information sharing	Stakeholders share information, Community capacity building, Community monitors plan activities	Community-based monitoring, Better information collection, NGO transparency
Managing human wildlife conflict	Workshops, Outreach, Exposure visits, Monitoring App, Water holes, Barriers, Mapping, Documentation	Communities share information, Community changes behaviour, Community awareness	Reduces human-wildlife conflict, Influence land use planning, Contribute to scientific information
Conservation agreements	Research, Mapping, Discussions, Conservation Agreements, Interaction and information sharing platform, Rules, Sanctioning	Stakeholder participation, Community negotiation, Informed consent, Reduce indiscriminate harvesting, Benefits if community conserves	Community conservation, Meeting community social requirements, Understand community types, Inclusive agreements governed by community
Management Plans	Conservation and management plans, Negotiation with Forest Department,	Community management of forests	Biodiversity conservation, Reduce human-animal conflict
Alternate Livelihoods			
Apiculture, Agriculture, NTFP collection and value addition, Marketing, Farmer Producer Organisation	Trainings, Workshops, Meetings, Discussions, Exposure visits, Sustainable harvest programme, Management plans, Supply tools/equipment, Value addition, Village enterprise, Loans, Mobilizing government schemes, Mapping, Research, Awareness campaigns, Networks, Marketing, Farmer Producer Company	Community skill-development and capacity building, Community awareness, Community self-confidence, Contributing knowledge resources, Community groups and networks, Community enterprises, Community income, Community marketing and co-operative selling, Financing, Organic agriculture on fallow lands, Sustainable NTFP harvest	Sustainable harvest, Biodiversity conservation, Community livelihood and better economic status, Community financial security, Co-create knowledge, Generate awareness, Local food sovereignty, Community health, Women's empowerment, Conserve traditional practices, Greater community bargaining power, Gain community rights
Ecotourism	Trainings, Infrastructure provision, Plastic clean up drive, Research, Ban on hunting/harmful harvesting	Ecotourism activities owned and managed by community	Community enterprise, Community livelihood, Enhanced ecological security
MGNERGA	Liaising with government, Gram Sabha discussions Exposure visits Job cards and zero balance bank accounts	Villagers started contributing a day a week towards common village activities Employment for villagers	Planting of trees, Employment opportunities for local communities, Community livelihood
Lantana furniture, Other skills	Trainings, Tools and equipment supply, rural skill learning centre, Grassroots organisations	Community income, Community skill-development and capacity building, Community builds machinery and tools, Sustainable harvest, Sharing knowledge	Community livelihood, Emancipation of underprivileged people, Improve quality of life and environment among rural communities

Programmes	Activities/Outputs	Outcomes	Impacts
Tenure Interventions			
Filing claims, Mapping, Others	Trainings and workshops, Exposure Visits, Filing FRA claims, Village level forum and discussions, Meetings, Liaising with government officials, Forest Rights Committee, Documentation, Reports, Management and conservation plans, Awareness programmes	Community capacity building, Community awareness, Community mapping, Forming village institutions, Government recognition of forest rights, Stakeholder interactions, Democratic decisions, Sense of community ownership, Communities fight malpractices, Share information	Implementation of Forest Rights Acts, Gain community rights, Understand community resource base, Strengthen community governance process, Provide examples for other communities, Equip communities to sustainably manage forests, Community livelihood
Capacity Building			
Strengthening village institutions, Village Savings, Others	Forming Gram Sabhas and village committees, Workshops, Trainings, Exposure visits, Community groups, Stakeholder communication channels, Discussions, Meetings, Resource use rules, Microplans, Documentation, Festivals, Funding, Surveys, Village Savings Group, School, Liaising with government officials,	Stakeholder capacity building, Community skill-development, Community self-confidence, Community groups and institutions, Women and youth participation, Increased collective action, Community leadership, Sharing knowledge, Community management plans, Community income	Strengthen village institutions and groups, Increase community participation and leadership, Increase collective action, Women empowerment, Strengthen community governance process, Encourage community initiatives to promote social cohesion, Raise awareness, Promote community advocacy on local issues Enhancing community's sovereignty and financial security, Equip communities to sustainably manage forests
Gender Equality	Training, Discussions, workshops, meetings, Women village assemblies, Self Help and youth groups, Community Health Workers, Community newsletter, Community Radio, Financial support	Community skill-development, Community groups and institutions, Community awareness, Women and youth participation, Challenge patriarchal structures	
Awareness Building			
Awareness building, Conservation education	School programs, Exposure visits, Events (festivals, competitions, walks), Door-to-door information dissemination, Outreach material, Curriculum development, Field courses, Reports, Trainings	Community awareness, Community self-confidence, Stakeholder consensus, Community participation, Networking, Sharing knowledge,	Building community awareness, Increasing participation of all groups, Strengthen community governance process, Promote research, Integrate indigenous knowledge and modern science
Citizen Science	Monitoring app, Mapping, Research	Community record animals movement	Understand humans-animal interaction
Advocacy			
Policy comments	Consultations, Meetings, Reports, Workshops, Field investigations, Case studies, Networking, Policy submissions, Policy briefs, Translations	Legal help for communities, Community access to materials, Community counter forceful evictions	Advocacy for democratic conservation laws, Challenging the exclusionary forms of conservation, Community based conservation, Sharing information
Lobbying/Protesting	Protests, Lobbying, Complaints, Public interest litigation, Participating in local forums, Formation village institutions	Communities counter forceful evictions and prevent of fund misappropriation, Communities agitate for rights, Community participation at different levels	Community organization, Increase transparency of development schemes,
Liaising with Government Departments	Exposure visits, Trainings, Communication channels, Constructive dialogue, Co-creating plans, Equipment and materials provision	Community awareness, Community self-confidence, Stakeholder consensus, Stakeholder capacity building, Community livelihood opportunities	Reducing mistrust and hostility between government and community, Biodiversity conservation

Programmes	Activities/Outputs	Outcomes	Impacts
		Communication	
Traditional Knowledge	Documentation, Data archive, Interactive sessions, Networks, Community groups, Teaching-learning spaces, Fellowships, Community media, Consultations, Exposure visits, Festivals, Outreach material, Product development, Bamboo nursery	Share traditional knowledge, Community awareness, Community self-confidence, Community access to local philanthropy, Community celebrates culture, Community income, Stakeholders interaction, Community access to materials, Women mobilisation	Community advocacy, Conserve traditional heritage, Women and youth empowerment, Create knowledge archive, Raise awareness, Trust building, Community health, Promote social cohesion, Promote co-existence, Community livelihood
Trust building	Social media, Newsletter, Books, Documentation, Natural History Society, Data archive, Spending time in villages	Information sharing with all stakeholders	Create knowledge archive, Raise awareness, Trust building
		Watershed Management	
	Eco-restoration, Equipment provision, Mapping, Trainings, Stakeholder consultations, Community Water Stewards, Resource materials, Outreach, Research, Water Security Plans	Community capacity building, Community awareness, Community monitors, Community mapping and research , Community participation	Understand, monitor and conserve water resources, Community water management, Biodiversity conservation, Trust building, Raise awareness, Providing clean water, Curtail water borne diseases,
		Research	
	Research, Publications, Database, Participatory meetings, Harvest Protocol, Translations, Presentations	Contribute to scientific information, Sustainable harvest, Community awareness, Participatory research, Knowledge sharing	Understanding and assessing the social and ecological threats and impacts, Community based conservation
		Health	
Nutrition and medicine connected to biodiversity	Health programmes, Kitchen gardens, Medicinal plants, Festivals, Booklets	Local species grown , Community livelihood options and income, Community celebrates culture, Stakeholders interactions, Community self-confidence	Cost effective community food security, sovereignty and nutrition, Biodiversity conservation, Community health, Community livelihood, Trust building
Improving health	Funding, Community Health Workers, Medical support, Health education, Trainings	Community Health Workers assist patients and interact with other stakeholders	Community health
Alternate materials	Building ecotourism facilities		Provision of cost effective infrastructure
		Climate Change	
Climate action	Social Economic Status profiles, Ecological calendars, Weather stations, Dream Sessions	Community groups source international funds	Funding climate change mitigation, Promote sustainable practices, Obtain advocacy leverage
Disaster management	Early warning system, Liaising with government	Coordinate with government departments	Improved disaster resilience and response
		Networking	
	Networks, Workshops, Meetings, Reports, Negotiation with Forest Department, Documentation, Popular media articles	Financial support, Collaboration with NGOs, Democratic community decision-making, Stakeholders participation, Community awareness	Network building, Community conservation, Enabling local community action
		Funding	
Providing funds	Grants, Student fellowships, Health Fund, Loans	Funding to NGOs, Students gain education, Bridge gap international and local advocacy, Networking	Women empowerment, Support grassroots initiatives
Fund raising	Funding proposals	Approaching funders for funding	

4.2.2 Type II NGO interventions – outputs, outcomes and impacts

The programme areas Type II NGOs are active in is shown in Figure 5. Biodiversity Management, Capacity Building, Awareness Building, Advocacy, Communication, Research, and Climate Change are preferred by all three NGOs. Two NGOs had interventions related to Alternate Livelihoods, Tenure Interventions, Health, Networking and Funding. Only one NGO was active in Watershed Management. In this section, outputs, outcomes and impacts of Type II NGO interventions are discussed (Table 6, with a more detailed table provided in Appendix B2).

Type II NGOs had more varied outputs than that of Type I NGOs, especially for Biodiversity Management. However, some outputs occurred throughout many programmes. These included research, training, exposure visits, technical and material support, maps, management plans, awareness programmes and outreach material and events like films, flyers, festivals, lectures etc.

The following outcomes then resulted: community skill-development and capacity building, community awareness, community participation in sustainably managing resources and increased community incomes.

Environmental impacts thus derived were biodiversity conservation, reduction of human-animal conflict and community resource management. Economic impact was mainly securing community livelihoods while the major social impact was community empowerment.

Type II NGOs characterised themselves as research based NGOs with a keen interest in studying the biodiversity of the region. Given the high population density of the area and the difficulties inherent within carrying scientific research in hilly terrain, NGOs tried to involve communities in ways that benefit both the community and biodiversity in the area. Their greatest difficulties lay in encouraging communities to participate in biodiversity conservation.

Looking closely at individual programme areas, it can be seen that NGOs have very diverse interventions in Biodiversity Management that cover each identified programme (Figure 8c). Other than the outputs mentioned above, NGOs also focus on identifying locations for interventions, undertake ecological restoration activities, tree planting and weed removal, and build information sharing networks among various stakeholders. Outcomes from community resource management and increased incomes enable impacts like biodiversity conservation, scientific and community monitoring, reduction of human-wildlife conflict and community livelihoods.

Type II NGOs had little interventions in Alternative Livelihoods and were mostly focussed on agriculture, apiculture, NTFP collection and value addition, marketing and farmer producer organizations (Figure 9c). Outputs included training centres, cooperative societies and

marketing activities. These resulted in sustainable community harvests, community group formation and leadership. These interventions sought to sequester carbon, generate interest within communities for conservation, and improve community health in addition to those mentioned above.

Only 2 NGOs were interested in Tenure Interventions (Figure 10c). They interacted with village institutions, raised awareness and suggested policy changes that increased community awareness and self-confidence and ultimately resulted in securing community livelihood and rights over the forest resource while preventing forced evictions. However, all three NGOs undertook Capacity Building programmes like strengthening village institutions, gender equality and other general interventions. Village groups were formed, meetings held and traditional knowledge documented. This resulted in an increase in community self-confidence, adoption of democratic decision making, increased participation of marginalised groups and the formation of village institutions. The greatest impact was enabling community conservation by building social institutions for natural resource management.

All NGOs undertook programmes in awareness building, conservation education, citizen science, and liaising with the government (Figure 11c). Other less popular programmes were traditional knowledge, policy comments and trust building. NGOs hosted school and university programs, created citizen monitoring apps and websites, mediated between community and forest department, submitted policy recommendations and documented traditional knowledge. In addition to community leadership, these interventions convinced governments to change policy based on the success of the interventions. Impacts included outreach to all stakeholders, developing conservation models, evolving a trust-based relationship with the community and using traditional knowledge to contribute to the scientific understanding of the area.

NGOs also had a large number of interventions related to Research (Figure 12c). Outputs included information centres, experiments, benchmarking, meetings with the community and scientific publications. The generated scientific information was shared with the community and other stakeholders to enable them to sustainably manage the resource.

Climate Change was another popular intervention area. NGOs worked to educate stakeholders on climate change impact, set up weather stations and prompted the formation of community networks to share information. They did so to promote activities like climate-smart agriculture that would result in carbon sequestration while buffering the community against a changing climate.

Other programme areas were less popular. One NGO undertook Watershed Management activities like ecological restoration and water source monitoring to reduce community water use. This was done to address water shortage, reduce climate impact and secure community livelihood. Similarly, under Health, one NGO promoted community health through gardens, traditional medicine and medical camps. Two NGOs worked towards

shifting community fuel sources from wood to gas and solar through research, funding and providing equipment in order to empower communities, reduce pressure on forests and improve community health. Two NGOs had interventions related to Networking including information networks, network of ecological practitioners and a student network to involve more stakeholders and promote community conservation through information sharing. Finally, NGOs provided communities with funding through scholarships, workshops, loans or equipment to promote community capacity building. Funds were raised from external donors.

Table 6: *Type II NGOs - outputs, outcomes, impacts (see Appendix B2 for more details)*

Environmental	Economic	Social

Programmes	Activities/Outputs	Outcomes	Impacts
Biodiversity Management			
Nurseries, Seed conservation	Identify native species, Collecting native seeds, Nursery, Seed banks, Distribute planting material, Vermicompost units, Research, Workshops, Trainings, Women's group, Community conservation plots, Seed villages, Seed exchange, Seed festival, Seed network, Awareness programmes	Community skill development, Community awareness, Youth participation, Community income increase, Provide community with planting material, Farmers conserve native seeds	Biodiversity conservation, Monitoring, Diversified native species mix, Address seed shortage, Document native species, Community health, Community livelihood
Tree planting, Ecological restoration	Identify intervention location, Rainforest restoration, Plant native species, Maps, Fencing, Research, Protocols, Workshops, Women's group, School gardens, Awareness programmes	Community skill development, Community awareness, Community self-confidence	Biodiversity conservation, Monitoring, Diversified native species mix, Address seed shortage, Sequester carbon, Document native species, Community confidence, Community livelihood
Invasive species management	Weed removal, Tree planting, Monitoring, Research, Survey, Exposure visit	NGO generates scientific data	Prevent the spread of invasive species, Document impact on cultural landscape use
Agroforestry	Trainings, Meetings, Technical and material support, Premium price for agroforestry crops, Vermicompost, Monitoring	Community capacity building, Community income, Community adopts agroforestry and other techniques	Biodiversity conservation, Sequester carbon, Forest friendly, climate smart agriculture, Reduce human wildlife conflict, Interest generation, Community livelihood
Management Plans	Management plan, Trainings, Participatory natural resource mapping	Community capacity building, Community awareness	Biodiversity conservation, Community capacity, Empower village institutions
Working on coffee estates	MoUs, Tree plantations, Native in coffee estates [6]	Estates use native species as shade trees	Biodiversity conservation, Bridge corporate and nature activities
Managing human wildlife conflict	Early warning systems, Information network, Liaising with government, Funding, Material provision, Awareness raising	Community participation, Accessible community information, Government support, Community awareness	Reduce human-animal conflict, Lower community stress, Community participation, Model landscapes
Conservation agreements, Wildlife Conservation, Corridor conservation	Trainings, Consultations, Conservation commitments, Equipment provision, Law translation, Research, Maps, Awareness programmes, Corridor Conservation Committee	Community capacity building, Community awareness, Shift of community to LPG (especially women)	Community interventions, Community health, Biodiversity conservation, Reduce human-animal conflict, Protect important wildlife corridors
Monitoring, Community monitors/Stewards	Protocols, Participatory and scientific resource monitoring, Documentation, Database, Training, Meetings, Scientific data, Materials provision	Share scientific data with community, Improved community harvesting techniques Community capacity building, Community awareness, Community participation	Understand key ecological trends, Address sustainable harvesting issues, Build community capacity
General	Anti-plastic campaign	Reduction in plastic use	Initiation of environmentally friendly programmes

Programmes	Activities/Outputs	Outcomes	Impacts
Alternate Livelihoods			
Apiculture, Agriculture, NTFP collection and value addition, Marketing, Farmer Producer Organisation, Ecotourism	Promoting agroforestry and cash crop cultivation, Sustainable harvest programme, Production units, Trainings, Exposure visit, Community Training Centre, Premium price, Farmer's Producer Company, Procuring and selling of products, Meetings, Equipment and technical support, Awareness programmes, Outreach materials, Exhibitions, Research, Joint liability groups, Cooperative society, Weekly markets, Sale outlets	Community capacity building, Community leadership, Community awareness, Youth participation, Community group formation, Community income, Community markets forest products, Community adopts agroforestry and other techniques, Sustainable community harvests, Community develops sustainable resource management strategies	Biodiversity conservation, Carbon sequestration, Improve community's natural resource management practices, Reduce human wildlife conflict, Community livelihood, Improved NTFP processing and quality, Interest generation, Community health, Community leadership, Women's empowerment
Lantana furniture	Lantana Craft Centres, Trainings, ID cards and insurance coverage, Product development, Market linkages	Community capacity building, Community income	Community livelihood, Promotion of tribal artisans, Invasive species reduction
Other skills	Trainings, Teaching forums, Equipment provision, Production units	Communities explore income sources, Communities set up village enterprises	Community livelihood
Tenure Interventions			
Filing claims, Mapping, Others	Workshops, Exposure visits, Community initiatives, Interact with village institutions, Scientific and Community resource maps, Policy interventions, Reports, Management Plans	Community awareness, Individual and community forest rights granted, Community self-confidence, Community produces maps, Community effort to sustainably use forest	Ensure tenure monitoring and management rights, Prevent forced relocation, Implementing FRA, Community livelihood, Reconciling community rights and livelihood needs with conservation goals,
Capacity Building			
Strengthening village institutions	Trainings, Workshops, Management plan, Interactions with village institutions, Forming village committees, Technical support and equipment, Meetings, Microenterprise development, Festivals	Community capacity building, Community awareness, Community self-confidence, Community participation, Community forest institutions, Community biodiversity management, Community income	Community conservation, Recognition of community biodiversity champions, Facilitate and motivate Gram Panchayats, Build social structures for sustainable resource management, Community livelihood
Gender Equality	Women's groups , Capacity development programme, Research, Employing government schemes, Documenting traditional knowledge	Capacity building of women, Community self-confidence, Women participation, Community awareness, Shift of community from fuel wood to LPG (mostly women benefited)	Community health, Women empowerment, Equitable energy access, Reduce human-wildlife conflict
Others	Trainings, Volunteer selection, Youth clubs, Biodiversity Conservation Corps, Innovation cell, Outreach materials, Publications in local languages, Whatsapp group, Directory of traditional healers	Capacity building of youths, Community participation, Community awareness, Children exposed to ICT, Community inputs on conservation and management, Community climate volunteers	Providing hamlet-level education support, Preserve traditional practices, Promote rural innovations

Programmes	Activities/Outputs	Outcomes	Impacts
Awareness Building			
Awareness building	Tribal Development Committee, Training, Workshops, Awareness camps, Food festivals, Native language awareness materials, Presentations, Interactions with village institutions, Films, Registration days, Street plays, Nature camps, Field visits, Exhibitions. Collaborative research projects	Community displays and sells NTFP products, General public awareness, Community awareness, Community leadership, Community capacity building, Local pastors deliver messages against wildlife poaching, Community inputs on conservation	Biodiversity conservation, Outreach to general public about biodiversity-related issues , Enhance food system awareness, Reach communities through faith, Develop relationships with communities, Community support for conservation
Conservation education	Training, Workshops, Awareness camps, Field visits, Lectures, Audio and print media, Classes for children, Hosting study abroad programmes, School gardens	Training teachers to communicate about biodiversity, Community volunteers, Community awareness, School children disseminate knowledge among peers	Disseminate knowledge and project learnings, Facilitate a learning environment, Work with multiple stakeholders, Community conservation
Citizen Science	Citizen monitoring, Websites, Citizen science programme	Crowdsourcing of scientific data from students, children and ordinary citizens, Increase people's access to scientific information	Modelling interventions, Generation of scientific data
Advocacy			
Policy comments, Liaising with Government Departments	Policy level interventions, Implement government schemes, Select community representatives, Microenterprise development, Provide equipment and trainings, Technical support, Mediate between community and Forest Department	Prompting government to change policy based on success of intervention, Involve local communities in planning,	Changes in policy at different levels, Community safety, Community livelihood, Designate Protected Areas.
Communication			
Traditional Knowledge, Trust building	Research , Document traditional knowledge, Meetings, Nature camps, Street plays, Outreach materials, Trainings, Publications in local languages	Community capacity building, Community awareness, Community inputs on conservation, Local pastors deliver messages against wildlife poaching, Community managed space to showcase their rich traditions	Understand community's existing knowledge, Understand community's relationship with forest resources, Discuss developmental issues, Develop relationships with communities
Watershed Management			
	Tree plantation , Plans, Village committees, Water sources renovation and construction, Field visits, Monitoring, Research	Community uses water efficiently, Community income (better crop)	Address water shortage , Reduce the climate change impact, Promote investments, Community livelihood
Research			
	Information Centres, Experiments, Research, Benchmarking, Training, Co-management plans, Meeting, Reports, Database	Share information with community , Community capacity building, Community awareness, Retrieval of disputed forest land from private owners	Facilitate flow of knowledge between stakeholders and researchers, Community conservation, Understand how community accesses forest

Programmes	Activities/Outputs	Outcomes	Impacts
		Health	
Nutrition , Improving health	Home garden, Distribution of seedlings, Trainings, Directory of tribal healers, Research papers, Reports, Medical Camps	Community capacity building, Community awareness	Enhance the homestead food crop diversity, Community health
Alternate energy/materials	Research , Funding, Provision of equipment and materials, Consultations	Increasing community access (especially women) to energy, Community has lower levels of anxiety Shift of community from fuel wood to LPG, Reduced community wood use	Women empowerment, Equitable energy access, Reduce human-wildlife conflicts, Biodiversity conservation
		Climate Change	
Disaster management	Education on nature based solutions, Community Weather Stations, Weather portal, Awareness programme, Exposure visits	Community awareness, Teachers and students collect and analyse weather data and share collected information with the community, Farmers plan their activities to weather conditions	School climate education programme and monitoring systems , Provide useful weather information
Climate action	Trainings, Action plan, Technical support, Ecological restoration, monitoring and tree planting, Meetings, Maps, Research	Community natural resource management practices' Community capacity building	Biodiversity conservation, Carbon sequestration, Achieving a 'Carbon neutral' district, Promote climate-smart, forest friendly (biodiversity, pollinator, soil health) agriculture
		Networking	
	Informal network of ecological restoration practitioners, Information network, University and student network, Partnership with grassroots institutions	Stakeholders information, Involve students in neighbourhood conservation	Community conservation
		Funding	
Providing funds	Scholarships to local students, Motivational workshop, Funding for solar powered fences	Community capacity building	Community capacity building
Fund raising	Approaching funders for funding		

4.2.3 Type III NGO interventions – outputs, outcomes and impacts

Type III NGOs are mostly interested in the restoration of degraded ecosystems and wildlife conservation along the Western Ghats. They are most active in Biodiversity Management, Alternate Livelihoods, Capacity Building, Awareness Building, Advocacy, Research, Health and Funding (Figure 5). Of the four NGOs, three were interested in Networking while two had interventions related to Communication and Watershed Management. One NGO was active under Climate Change while no NGOs were interested in Tenure Interventions. The outputs, outcomes and impacts of these Type III NGO programmes are described below (Table 7, with a more detailed table provided in Appendix B3).

The most common outputs were tree plantation, ecological restoration activities, providing materials and funding for these activities, monitoring and maintenance, trainings, interacting with community institutions, and awareness programmes.

The outcomes of these activities included community participation in restoration activities, providing communities with alternative income sources and raising awareness among a variety of stakeholders. The resulting impacts were biodiversity conservation, forest restoration, fostering connections between the community and forest resource, reducing human-wildlife conflict, securing community livelihoods, and raising awareness.

NGOs gave varied reasons as to their interventions. However, all firmly believed that ecological restoration was the need of the hour in their working areas and that community involvement in restoration activities was a must for long term success. However, they faced many challenges including difficult working terrain, unwillingness among the community to involve themselves, local politics that posed obstacles, and a lack of funding required to upscale activities.

Most NGO activities were concentrated on Biodiversity Management, especially on planting useful, native trees, restoring degraded areas and removing weeds to prevent the spread of invasive species (Figure 8d). They also undertook Watershed Management interventions to ensure greater availability of water and higher chances of restoration success. Sometimes, this required framing management plans and conservation agreements to be signed with land- and coffee estate owners. NGOs pursued eco-restoration by employing and encouraging community members to plant and maintain trees, protect forest areas through fencing, fighting forest fires, etc. Quality of restored plots was maintained by monitoring for a period of three years. They attempted to increase community incomes from forests to better incentivise conservation and undertook awareness activities. Their major impacts were mostly environmental and related to, in addition to the ones above, corridor conservation, disaster resilience, and the provision of ecosystem services. NGOs also sought to provide communities a stable livelihood source and reduce migration from villages while promoting community conservation.

Under Alternative Livelihoods, NGOs sought to promote activities that would contribute to eco-restoration (Figure 9d). They focussed on apiculture and climate-smart agriculture to conserve bee populations and promote NTFP collections through trainings and awareness building. They also sought to demonstrate the benefits forests could have by promoting NTFP value addition, *Lantana* furniture making and ecotourism. NGOs provided communities with infrastructure and trainings to increase their capacity to carry out these tasks. One NGO even implemented the sale of generated carbon credit. The aim of these interventions was to provide communities with steady sources of alternative income, preferably from the forest resource, in order to gain their support and work towards biodiversity conservation.

While none of the NGOs had Tenure Interventions, all of them focussed on a variety of Capacity Building programmes (Figure 10d). They offered trainings, interactions with experts and technical support and infrastructure in order to increase community capacity, foster group formation and leadership skills, and provide alternative employment options. NGOs ultimately wished to involve communities in conservation activities and offer them financial security.

Type III NGOs were also active in awareness building, conservation education and interacting with government agencies (Figure 11d). They undertook a host of different measures to reach out to all stakeholders – the general public, students, local communities, government officials – to increase participation and interest in conservation. Interestingly, one NGO attempted to create a religious link between humans and wildlife. In a citizen science programme, school children were provided with camera traps to collect and analyse wildlife data that was then shared with scientists around the world. NGOs also commented on policies and worked with governments to include communities in forest management. Finally, two NGOs relied on community traditional knowledge to carry out interventions and took steps to ensure that this knowledge was preserved.

All NGOs also undertook Research to develop baseline data and understand the region (Figure 12d). By involving communities in the research process, they provided a steady source of income. NGOs also promoted communities to grow locally available medicines and food-crops, and undertook awareness programmes to improve community health. Interventions promoting the use of alternative energy through the introduction of more effective fuel-wood cooking stoves and water heaters also worked to increase community trust in NGO activities.

Finally, NGOs built networks among experts, other NGOs, and stakeholders to share resources, information and expertise. These were used to build a successful conservation model and ease interactions with communities. NGOs also used urban sponsorship and funds raised from corporate donors to incentivise communities to protect forests and participate in biodiversity conservation while funding their own interventions.

Table 7: *Type III NGOs - outputs, outcomes, impacts (see Appendix B3 or more details)*

Environmental	Economic	Social

Programmes	Activities/Outputs	Outcomes	Impacts
Biodiversity Management			
Nurseries, Seed conservation	Planning, Nursery, Training, Exposure visits, Seed collection and storage, provide planting material, Growing RET species	Community capacity building, Community income	Biodiversity conservation, Breed native, useful saplings, Increase the survival rate of planted trees, Reducing mono-cropping of exotic species, Ecological restoration, Corridor Conservation, Provision of ecosystem services, Establish conservation model, Mitigate climate change, Disaster resilience, Community forest management, Reduce invasive species, Reduced human-wildlife conflict, Steady community livelihood, Community ownership, Community awareness, Reduce migration from villages
Tree planting, Ecological restoration, Corridor conservation, Invasive species management, Agroforestry, Coffee estates, Managing human wildlife conflict, General	Site selection, Planting trees , Ecological restoration, Purchase land, Maintenance, Monitoring, Scaling up, Awareness raising, Weed removal, Interactions community representatives, Providing material/funding/ labour, Survival based incentives to community, MoU with forest department or community, Experimental plots, Protocols, Form community groups, formed, Trainings	Community plants and maintains native trees, Community organises to stop forest fire, Community stops cutting trees, Community agrees to provide infrastructure, Community income, Community receives firewood and material, Community capacity building, Community carry out restoration activity, Community leadership, Community awareness, Community self-confidence, Community group formation, Attract tourists, Community develops sense of stewardship over the forest	
Management Plans	Restoration plots, Planning, Mapping, Fund raising, Monitoring, Reports, Management plan with Government approval	Binding rules for protection and sustainable community harvesting	Ensure quality of the restored plot, Community forest management
Conservation agreements	Approaching community, Selecting interested participants, Conservation agreements, Compensation/Incentives to the community, Tree plantation	Coconut plantation owners maintain vulture nests, Forest owners agree to protect forest and allow tree plantation, Community self-reliance, Applications from private forest owners	Ecological restoration, Biodiversity conservation, Monitoring , Establish conservation model, Community forest management, Community livelihood
Wildlife Conservation	Interactions with village institutions, Meetings, Night patrolling, Fencing, Research, Camera trap, Monitoring, Trainings, Outreach and awareness activities, Ecological restoration	Awareness for general public and stakeholders, Community rescues wildlife with Forest Department, Attract tourists, Increasing scientific data on wildlife, Community income	Established Human-animal religious relationship, Raising awareness, Wildlife conservation, Understanding wildlife, Biodiversity conservation, Community livelihood
Monitoring, Community monitors/Stewards	Monitoring, Maintenance of restored areas, Research, Night patrolling, Trainings, Community Stewards	NGO can identify problems and provide solutions, Community monitoring, Foster growth of local conservationists	Monitoring and protection of endangered species, Ensure success of the project, Shift ownership of conservation interventions to community
Alternative Livelihoods			
Apiculture, Agriculture	Training, Workshop, Meetings, Market products, Equipment provision, Technical support, Awareness programmes, Experimental farming,	Inspire locals to collect of NTFPs, Farmers adopt climate smart agricultural techniques, Community skill development and capacity building, Community awareness, Community income, Employment for women	Biodiversity conservation, Fosters healthy inter-dependence between people and ecology, Understanding factors affecting the activity, Community livelihood, Community awareness, Community support for NGO interventions

Programmes	Activities/Outputs	Outcomes	Impacts
NTFP collection and value addition, Marketing, Other skills	Training, Planting and collection of NTFP species, Restoration activities, Nursery, NTFP value addition, Collaborate with local groups, Production units, Market creation, Marketing, Online shop for product sale, FSSAI registration for food products	Community capacity building, Women make articles and foodstuff, Community income, Offer youths alternative livelihood options	Biodiversity conservation, Revive traditional knowledge and the connection of communities to their environment, Fosters healthy inter-dependence between people and ecology, Community livelihood, Community support for NGO interventions
Payment for Ecosystem services	Selling carbon credits/offsets	Community income from forest conservation	Biodiversity conservation, Alternate income for community
Capacity Building			
Strengthening village institutions	Community groups, Work with village institutions, Trainings	Community participation and decision making, Communities group formation and leadership	Include communities in restoration activities
Village Savings	Savings account, Community discussions, Trainings	Community savings, Communities operate bank account	Financial security for the community
Gender Equality	Trainings, Online shop for product sale, FSSAI registration for food products, Providing base materials	Women make articles, lantana furniture, apiculture and foodstuff, Capacity building of women, Income for women	Community livelihoods, Community support for NGO interventions, Women empowerment, Reduced pressure on restored area
Others	Trainings, Workshops, Exposure visits, Restoration activities, Provide technical and monetary support, Ensuring buyers, Field supervisor, Learning centre, Interactions with experts, Local knowledge base	Capacity building and skill development of youth, Community involvement in creating learning spaces, Community awareness, Offer youths alternative livelihood options, Community income	Biodiversity conservation, Revive traditional knowledge and community connection to their environment, Community conservation, Community livelihood, Community support for NGO interventions
Awareness Building			
Awareness building, Conservation education, Citizen Science	Awareness programmes, Learning centre, Local knowledge base, Outreach materials (Leaflets, Awareness boards), Film shows, Safaris, Folk dances, Street plays, Temple statues, Field visits, Festivals, Exhibition, Community meetings, School visits, Wildlife education camps, Training, Provide equipment	Village children visit nature, Community involvement in creating learning spaces, Community awareness, Awareness for general public, Environmental education for students, NGO members understand ecology better, School children collection and analyse camera trap data, Collected data repository available to scientists, Community conservation plots	Revive traditional knowledge and the connection of community with their environment, Engage and empower community conservation, Wildlife conservation, Create working conservation model, Raise awareness, Establish human-animal religious relationship, Promote scientific understanding among school children
Advocacy			
Policy comments	Policy advocacy	Passing of laws by the state government	Encourage policy changes to protect forests
Liaising with Government Departments	Joint patrolling, Market creation through Government Departments, Work with government, MoU with Forest Department, Restoration of government forests	Stakeholders participation, Community employment, Community income, Community rescues wildlife with Forest Department, Community restoration	Biodiversity conservation, Suppression of invasive species, Community livelihood, Community economic status improves

Programmes	Activities/Outputs	Outcomes	Impacts
Communication			
Traditional Knowledge	Trainings, Partner with community groups, Manual restoration activities, Local knowledge base, Community stewards, Awareness building	Use community traditional knowledge, Knowledge transfer from elders to youths, Community participation and capacity building, Community employment	Foster healthy inter- dependence between people and ecology, Revive traditional knowledge and community connection to environment, Community livelihoods
Trust building	Smoke free and low fuel chullas (stoves), Boiler to heat bathing water, Trials with alternate technology	Community reduces firewood consumption and forest forays, Villagers have more time and better health, Communities participation	Trust-building, Increase community quality of life, Reduce pressure on restored area, Reduce human-animal conflicts, Reduce spread of invasive weeds
Watershed Management			
	Water harvesting, Infrastructure provision, Work with village institutions, Ecological restoration	Community implements water harvesting methods in forests, Farmers plant native grasses	Increased water availability, Water improves, Arrest soil erosion, Riparian buffer enhancement ,
Research			
	Surveys, Experiments, Community interactions, , Baseline data, Document and collect data, Reports, Presentations	Joint knowledge development between NGO and community, Influence communities towards ecological restoration, Community income	Create working conservation model, Increasing scientific data, Understand about how about how the community feels about NGO, Community livelihoods
Health			
Nutrition and medicine, Improving health	Local knowledge base, Documentation, Medicinal plant extraction, NTFP collection, Solid waste management, Blood and organ donation drives	Community participation, Community awareness, Community income	Engage and empower community conservation, Community health, Forest protection, of forests, Community livelihoods
Alternate energy/materials	Smoke free and low fuel stoves, Boiler to heat bathing water, Trials with alternate technology	Community reduces firewood consumption and forest forays, Villagers have more time and better health, Communities participation	Trust-building, Increase community quality of life, Reduce pressure on restored area, Reduce human-animal conflicts, Reduce spread of invasive weeds
Climate Change			
Disaster management	Interaction with village institutions, Site selection, Provide material/labour/funding, Ecological restoration, Community guidance	Community awareness, Community income, Community restoration and tree planting	Ecological restoration, Reduction in disasters risk, Degraded land restored, Reduce soil erosion, Riparian buffer enhancement
Networking			
	Informal practitioner and stakeholder network, Becoming trustees of local NGO, Discussions, Consultancy, Attending scientific conferences	Sharing of information, resources and expertise between stakeholders, Local NGO interacts with community,	Affordable conservation model, Successful eco-restoration, Easier interactions with the community, Awareness building
Funding			
Providing funds	Urban sponsorship, Payment for labour and materials,	Community income, Community self-confidence, Community leadership, Community stewardship, Community awareness, Community participation	Community livelihood and financial security, Biodiversity conservation, Create conservation model, Reduce migration from villages
Fund raising	Fund raising like solicitation, charity runs, etc.	Funds from interested corporate sand other donors	Support NGO activities

4.3 How do NGOs interventions reflect scientific literature on managing CPRs?

This section discusses the results of coding the above Theory of Change analysis against the expanded set of design principles described in the Theoretical Framework (2.2 Theoretical Framework). The assignment of design principles and the reasoning behind it is provided in detail in Appendix C). First, a general overview is given before each type is discussed in detail.

4.3.1 Overview

From Figure 13, it is clear that some principles are employed more than others. Although all design principles were used by at least one NGO, the rate of their adoption varied wildly.

All 10 NGOs had interventions that contributed to applying 8 principles. NGOs defined the boundaries of the resource base through (participatory) mapping exercises. These enabled the NGO to plan its interventions and the generated information allowed communities to claim harvest rights over the resource. The drafting of community management plans allowed NGOs to influence the framing of appropriation rules that fit the local context. NGOs not only prompted communities to frame these plans but also provided key information on the status of the forest resource through research interventions.

This information was obtained by monitoring the resource. While some NGOs explicitly promoted community resource monitoring by building community capacity, other NGOs preferred to monitor the resource themselves. However, NGO personnel carrying out on-ground monitoring activities were often local residents with some links to the community.

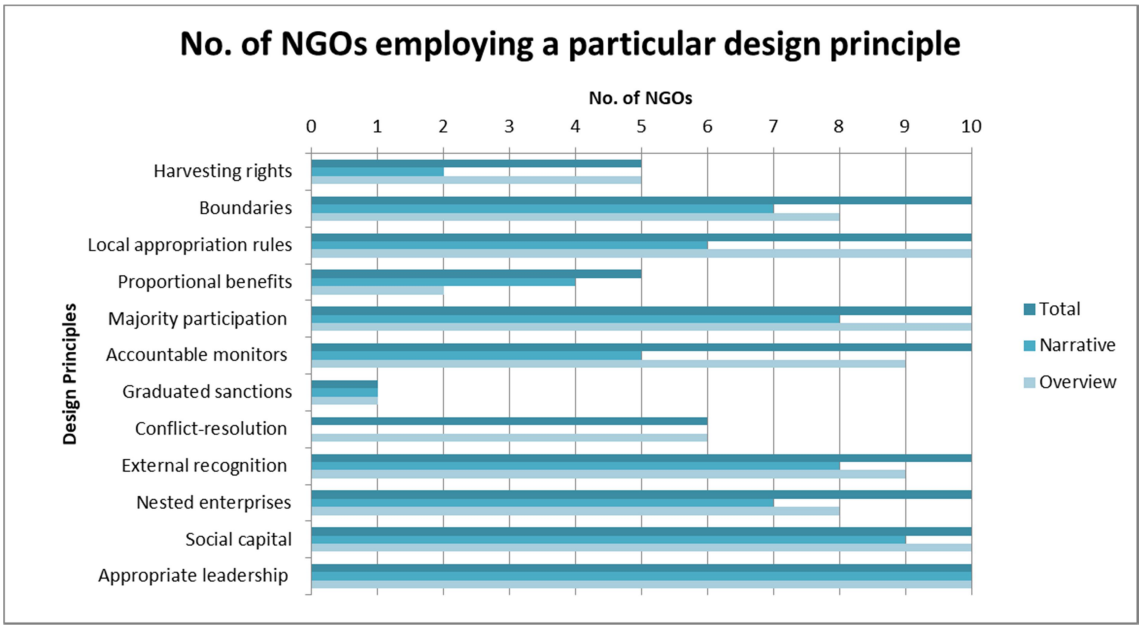
All NGOs strived to ensure participation of all community members in decision making. Many NGOs worked towards including women and youth in decision making processes by hosting discussions, providing trainings and employment support. Some NGOs also attempted to form community institutions and groups like village assemblies (Gram Sabhas) or self-help groups.

These interventions were tightly connected to the recognition of community forest rights by external authorities and nested enterprises. Some NGOs preferred to implement the Forest Rights Act to ensure that the government officially recognised community rights. All NGOs, however, worked to mediate between government officials and the community in various ways. For nested enterprises, NGOs built networks and used advocacy to involve the community at different levels of the governance process.

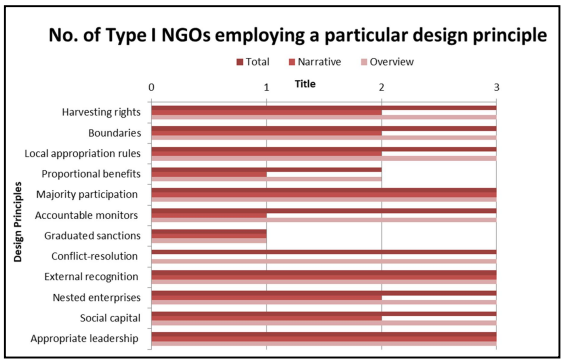
Of all principles, NGOs were most focussed on building social capital with the community and in building community capacity and leadership. This can be seen by the large extent to which these latter principles were reflected in both the narrative and overview lenses of

analysis. NGOs used exposure visits and trust building exercises to build social capital. They also hosted trainings and workshops and provided funding to improve community capacity.

Figure 13: *Number of NGOs employing each design principle*



(a)



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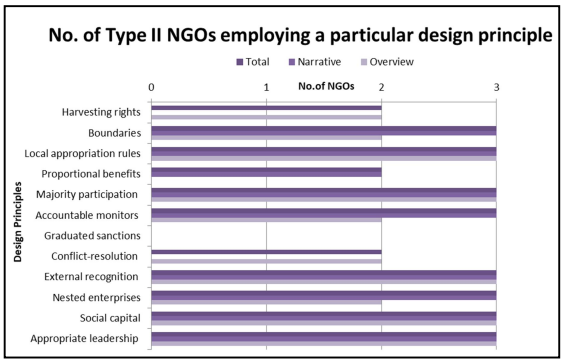

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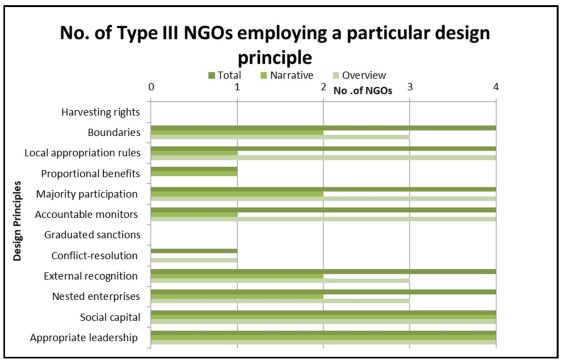


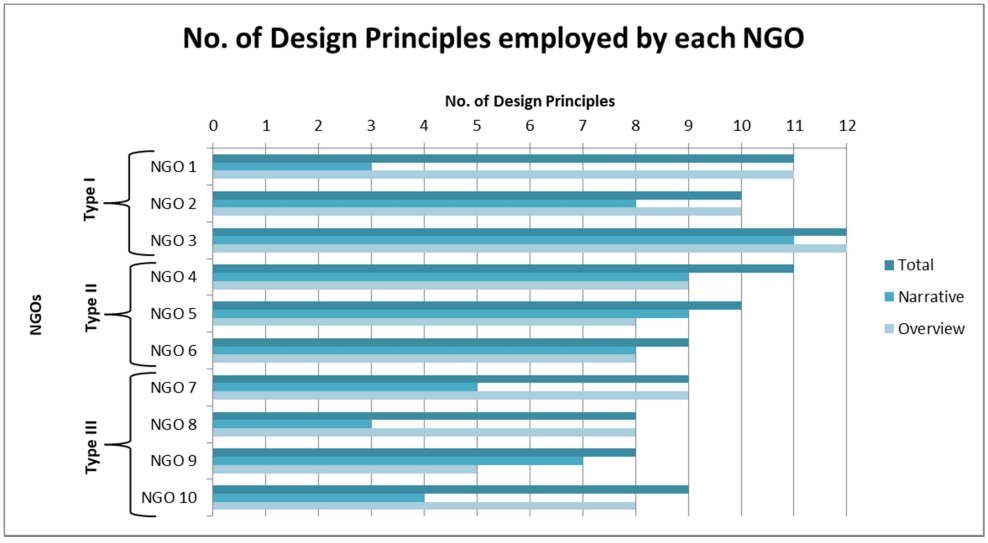
(d)

Other design principles were less popular. Conflict resolution was preferred by only 6 NGOs and often took the form of mediation between communities and external actors like the Forest Department. At the same time, proportional benefit sharing was reflected by 5 NGOs, mostly in the form of creating co-operative, community run organisation to sell forest produce. NGOs felt that these processes, when occurring within communities, were best dealt with by the communities themselves without external intervention.

Five NGOs also implemented activities that sought to define community harvesting rights. This was only reflected in Tenure Interventions, especially those related to filing claims under the Forest Rights Act, 2006. Claims granted under the Act allow communities to collectively and individually harvest NTFPs and cultivate land within government controlled forests. Formerly, these rights rested with the Forest Department.

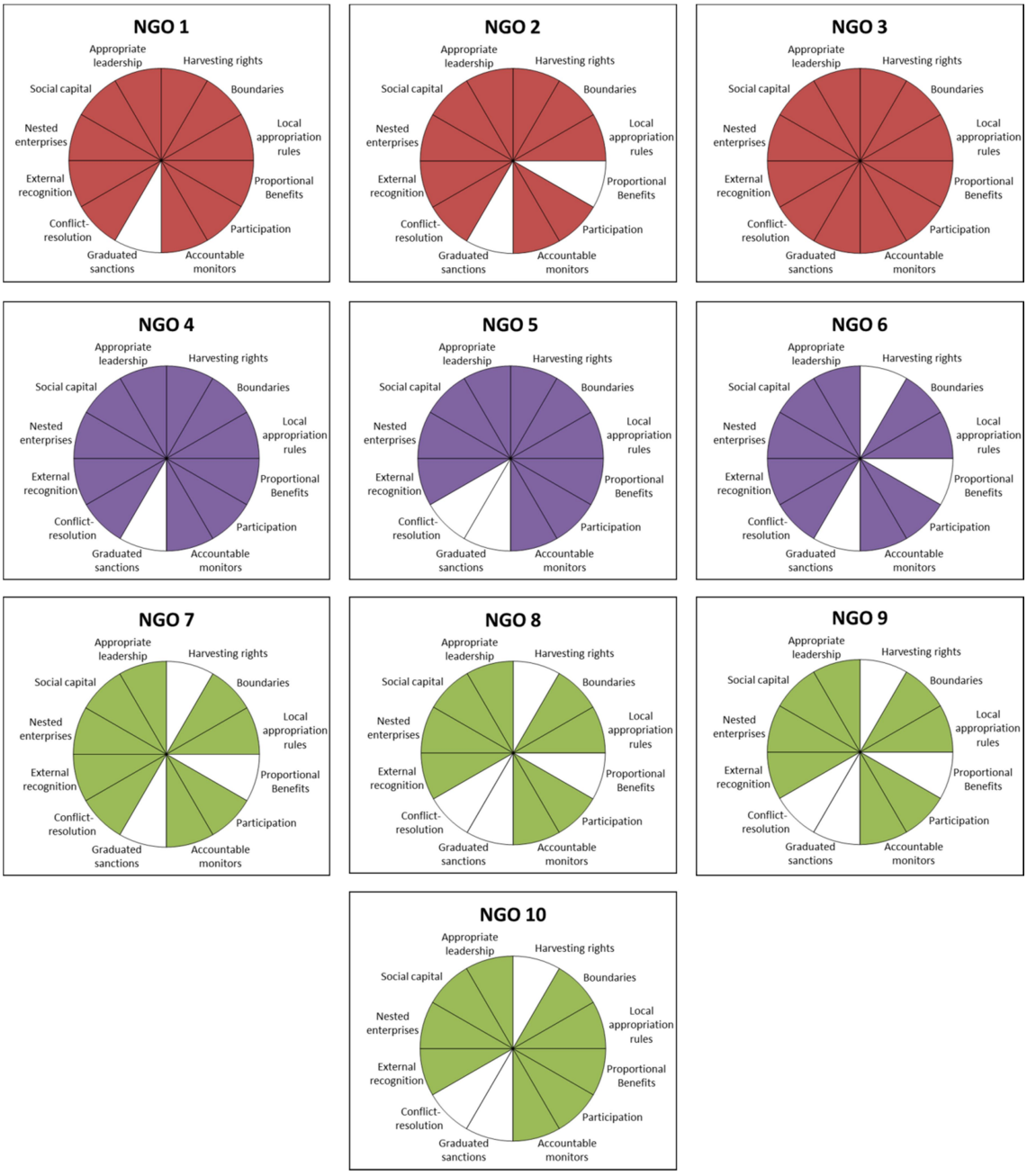
Finally, only one NGO pursued interventions that applied graduated sanctions. Again, NGOs were reluctant to interfere in what they felt was best left to the community. The one NGO who applied the principle did so through conservation agreements where participating community members were given certain social benefits in exchange for conserving the forest resource. These benefits were withheld one at a time if the participant failed to comply. While other NGOs also had conservation agreements, the key difference lay in that most agreements promised survival benefits, i.e., participants received benefits *after* conservation was proved rather than before as in the first case.

Figure 14: *Number of Design Principles used by each NGO*



It is also interesting to compare the number of design principles each NGO uses (Figure 14 and Figure 15). While NGO 3 employed all 12 principles, NGO 4 and NGO 1 came a close second with 11 principles each. NGO 2 and NGO 5 used 10 principles and NGOs 6 and 7, 9 principles. Finally, NGOs 8 and 9 used the least number of principles, with 8 each. Remarkably, any given NGO used more than half of the identified principles. The differences between individual NGOs are discussed per type.

Figure 15: *Design Principles used by each NGO*



Based on this information, some insights into the co-occurrence of principles can be derived (Figure 16). This indicated the number of NGOs who use these principles in conjunction with each other. Most principles (boundary definition, local rules, majority participation, accountable monitoring, and external recognition of community rights, nested enterprises, social capital and appropriate leadership) occurred together the maximum number of times, i.e. 10. Conflict resolution occurred with these principles 6 times while harvesting rights and proportional benefits occurred with them 5 times each. Graduated sanctions appeared with all other principles only once.

Interestingly, harvesting rights co-occurred with proportional benefits and conflict-resolution only 4 times, while the latter two co-occurred thrice. This suggests that the greatest difference between how NGOs apply these principles lies among these principles. These differences are further highlighted in the following sections.

Figure 16: *Co-occurence of Design Principles*

Overall co-occurrence of Design principles	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Harvesting rights	0	5	5	4	5	5	1	4	5	5	5	5
Boundaries	5	0	10	5	10	10	1	6	10	10	10	10
Local appropriation rules	5	10	0	5	10	10	1	6	10	10	10	10
Proportional Benefits	4	5	5	0	5	5	1	3	5	5	5	5
Participation	5	10	10	5	0	10	1	6	10	10	10	10
Accountable monitors	5	10	10	5	10	0	1	6	10	10	10	10
Graduated sanctions	1	1	1	1	1	1	0	1	1	1	1	1
Conflict-resolution	4	6	6	3	6	6	1	0	6	6	6	6
External recognition	5	10	10	5	10	10	1	6	0	10	10	10
Nested enterprises	5	10	10	5	10	10	1	6	10	0	10	10
Social capital	5	10	10	5	10	10	1	6	10	10	0	10
Appropriate leadership	5	10	10	5	10	10	1	6	10	10	10	0

(a)

Type I: Co-occurrence of Design principles	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Harvesting rights	0	3	3	2	3	3	1	3	3	3	3	3
Boundaries	3	0	3	2	3	3	1	3	3	3	3	3
Local appropriation rules	3	3	0	2	3	3	1	3	3	3	3	3
Proportional Benefits	2	2	2	0	2	2	1	2	2	2	2	2
Participation	3	3	3	2	0	3	1	3	3	3	3	3
Accountable monitors	3	3	3	2	3	0	1	3	3	3	3	3
Graduated sanctions	1	1	1	1	1	1	0	1	1	1	1	1
Conflict-resolution	3	3	3	2	3	3	1	0	3	3	3	3
External recognition	3	3	3	2	3	3	1	3	0	3	3	3
Nested enterprises	3	3	3	2	3	3	1	3	3	0	3	3
Social capital	3	3	3	2	3	3	1	3	3	3	0	3
Appropriate leadership	3	3	3	2	3	3	1	3	3	3	3	0

(b)

Type II: Co-occurrence of Design principles	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Harvesting rights	0	2	2	2	2	2	0	1	2	2	2	2
Boundaries	2	0	3	2	3	3	0	2	3	3	3	3
Local appropriation rules	2	3	0	2	3	3	0	2	3	3	3	3
Proportional Benefits	2	2	2	0	2	2	0	1	2	2	2	2
Participation	2	3	3	2	0	3	0	2	3	3	3	3
Accountable monitors	2	3	3	2	3	0	0	2	3	3	3	3
Graduated sanctions	0	0	0	0	0	0	0	0	0	0	0	0
Conflict-resolution	1	2	2	1	2	2	0	0	2	2	2	2
External recognition	2	3	3	2	3	3	0	2	0	3	3	3
Nested enterprises	2	3	3	2	3	3	0	2	3	0	3	3
Social capital	2	3	3	2	3	3	0	2	3	3	0	3
Appropriate leadership	2	3	3	2	3	3	0	2	3	3	3	0

(c)

Type III: Co-occurrence of Design principles	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Harvesting rights	0	0	0	0	0	0	0	0	0	0	0	0
Boundaries	0	0	4	1	4	4	0	1	4	4	4	4
Local appropriation rules	0	4	0	1	4	4	0	1	4	4	4	4
Proportional Benefits	0	1	1	0	1	1	0	0	1	1	1	1
Participation	0	4	4	1	0	4	0	1	4	4	4	4
Accountable monitors	0	4	4	1	4	0	0	1	4	4	4	4
Graduated sanctions	0	0	0	0	0	0	0	0	0	0	0	0
Conflict-resolution	0	1	1	0	1	1	0	0	1	1	1	1
External recognition	0	4	4	1	4	4	0	1	0	4	4	4
Nested enterprises	0	4	4	1	4	4	0	1	4	0	4	4
Social capital	0	4	4	1	4	4	0	1	4	4	0	4
Appropriate leadership	0	4	4	1	4	4	0	1	4	4	4	0

(d)

4.3.2 Type I NGOs

All three Type I NGOs adopted nearly every identified design principles (Figure 15). However, only two NGOs utilised proportional benefits and one graduated sanctions. Looking closer, it can be seen that while NGO 3 utilises all design principles, NGO 1 does not use graduated sanctions and NGO 2 does not use graduated sanctions or proportional benefits.

This is further reflected in the co-occurrence chart (Figure 16b), where all principles co-occur with each other three times except for proportional benefits (co-occurs with others twice) and graduated sanctions (co-occurs once).

These findings are in line with the Type I NGO objectives to help communities become self-reliant in managing their forest resources. Compared to other types, Type I NGOs collectively utilise that highest number of design principles together.

4.3.3 Type II NGOs

Type II NGOs applied almost all the design principles (Figure 13c). However, only 2 NGOs utilised harvesting rights and conflict resolution practices, and no NGOs used graduated sanctions. When considering individual NGOs (Figure 15), it can be seen that NGO 4 only does not use graduated sanctions, while NGO 5 does not use graduated sanctions and conflict resolution. While their mandate is mostly research, both these NGOs are interested in how communities and forests interact. They work towards improving these interactions so that both communities and forests are benefitted.

On the other hand, NGO 6 focuses on using research to conserve wildlife. They share their findings with communities to decrease human impacts on forest resources. Thus, they use the least number of principles among the Type II NGOs. They do not have interventions that address harvesting rights, proportional benefits and graduated sanctions. Interestingly, they do apply some form of conflict resolution – when there is conflict, the NGO sits down with the community to discuss how to better tailor their programmes.

The differences between these NGOs do impact how principles co-occur across Type II (Figure 16c). While almost all principles occur with each other, graduated sanctions does not occur with any other principles. Harvesting rights, proportional benefits and conflict resolution were present with other principles twice. However, conflict resolution only occurred with harvesting rights and proportional benefits once each.

4.3.4 Type III NGOs

Type III NGOs collectively employed the least number of design principles of all the types (Figure 13d). No NGOs had interventions that addressed harvesting rights or graduated sanctions, while only one NGO applied proportional benefits and conflict resolution measures. The other principles were used by all NGOs.

There were clear differences in which design principles individual NGOs adopted (Figure 15). NGO 7 did not use harvesting rights, proportional benefits, and graduated sanctions while NGO 10 did not use harvesting rights, graduated sanctions or conflict resolution. NGOs 8 and 9 used the same principles and did not employ harvesting rights, proportional benefits, graduated sanctions or conflict resolution.

This was reflected in the co-occurrence chart (Figure 16d). While most principles again co-occurred with each other, harvesting rights and graduated sanctions were not present with any other principle. However, proportional benefits and conflict resolution occurred with every other principle once but did not co-occur together.

These results line up with Type III NGOs stated objectives of being ecological restoration and wildlife conservation NGOs. Their interventions are mostly focussed on decreasing negative community impact on wildlife and forests rather than promoting collective community governance.

The next section discusses the implications of these findings.

5. Discussion

This section first discusses the important aspects of the above results and before placing these results in context of current scholarship on CPRs. It then reflects on the methods used and the limitations faced during the course of this research. Finally, it suggests some avenues for future research.

5.1 Reflection on results

5.1.1 Similarities and differences in NGO interventions

While NGOs differed mostly in their programme areas and programmes, the activities undertaken under shared programmes tended to be similar.

From the above results, it can be seen that NGOs in the Western Ghats are active in many different programmes under 13 broad programme areas. However, the programmes NGOs chose to implement highly depended on their stated objectives, leading to differences across the different types of NGOs. Within particular programmes, NGOs (of a specific type and very often across types) seemed to employ very similar activities and outputs, resulting in almost the same outcomes and impacts (see Section 2.4).

This suggests that NGO interventions do not vary in their substance (although there are some outliers and context-specific tailoring of activities), but rather in their focus areas. As mentioned above, many NGOs stated that they were not active in particular programme areas because it fell outside the scope of their objectives. Some NGOs also felt that focus on particular programme areas (like biodiversity conservation) was needed to be able to provide the base materials before expanding their activities. Funding was often quoted as a key challenge in up-scaling planned activities. Connecting interventions more explicitly to commons literature may allow NGOs to offset this limitation by accessing new funding sources.

The similarities between NGOs might mean that they are learning from each other. Indeed, NGOs often mentioned that this was the case during interviews. However, they also made clear that it was necessary to tailor activities to the specific context of their individual working areas.

5.1.2 Programme areas and programmes are varied, but interlinked

NGOs intervene in different programme areas, some of which seem only peripherally linked to forest management. However, these programmes under these areas tend to be interlinked, even across different programme areas.

As mentioned above, NGOs are active in 13 broad programme areas with various programmes under each. While some of these programmes do not seem directly connected

to forest management (for e.g. Alternative Livelihood interventions like agriculture or interventions connected to Health), the outcomes and impacts appeared to feed into other programme areas (see Table 5, Table 6 andTable 7).

NGOs mostly used programmes targeted at areas outside of the forest CPR to drum up support for their interventions. For example, many NGOs used interventions under Alternative Livelihoods in conjunction with outreach activities (Awareness Building) to provide communities with incentives to collectively manage or conserve the forest resource (Biodiversity Management). Some NGOs used weeds removed under invasive species management (Biodiversity Management) to provide communities with alternative energy sources (Health intervention) or base material for furniture making (Alternative Livelihoods).

These results suggest that NGOs view the landscape as one cohesive whole. This was reflected in the rationales they provided for implementing certain activities (see Section

4.2 How do NGOs intervene in forest commons? and Appendix B: NGO interventions – outputs, outcomes, impacts, reasons and difficulties for more details). Interventions were not just targeted at the community, but also at other stakeholders like the general public, government officials, etc. Most NGOs seemed relatively aware of the need to cover multiple aspects of collective forest management to account for internal and external influences on collective action.

5.1.3 Most NGOs apply most of the design principles in some form

All NGOs applied 8 of the 12 identified principles in some way, while the remaining 4 principles were applied by half the NGOs or less. Of these, conflict resolution was utilised by 6 NGOs, harvesting rights and proportional benefits by 5 NGOs, and graduated sanctions by only 1 NGO. Social capital and community leadership were the most commonly used principles.

These similarities were reflected in the design principles each NGO applied. While most of the 12 identified principles were employed by all the NGOs, four principles (harvesting rights (5 NGOs), proportional benefits (5 NGOs), conflict resolution (6 NGOs), and graduated sanctions (1 NGO)) were adopted by half the NGOs or less (Section 4.3).

NGOs mostly refrained from employing proportional benefits, conflict resolution and graduated sanctions because they felt that those were best decided by the community and did not want to interfere in internal community structures. With harvesting rights, Type I and Type II NGOs who were more likely to adopt it than Type III NGOs. Harvesting rights were often tied closely to securing the community's tenure rights over the forest. Some NGOs who did not promote harvesting rights often stated that it was outside the scope of their objectives. Alternatively, others did not wish to interfere in what they felt were community processes.

Social capital and community leadership and capacity were the most common principles used. This was in line with the focus NGOs placed on gathering support for their activities from within the community as well as incentivising communities to collectively manage forests (see above). During interviews, NGOs also stated that their activities should enable communities to become self-reliant in the management of their shared resources. The rationale was that while communities would remain, it was unlikely that the NGO would be active in the same working area forever.

This suggests that NGOs' work closely resembles the current scientific literature on managing CPRs. However, any deviation from these principles appears to stem from NGOs wanting to minimise their interference in community structures and attempting to enable community sovereignty.

5.1.4 Differences between types of NGOs

Type I NGOs were more likely to have the highest number of co-occurring design principles, while Type II was less so. Type III NGOs had the least number of co-occurring design principles.

These results can potentially be explained on the basis of stated objectives of various NGO types. As NGOs eager to promote social development, Type I NGOs had many more interventions targeted to local communities. This means that they are more likely to employ a greater number of design principles (Section 4.3.2). Thus, all design principles co-occurred at least once with each other.

Type II NGOs, however, focus more on research and have fewer interventions targeted at communities. Thus, they employed less design principles (Section 4.3.3), resulting in a lower rate of co-occurrence.

Lastly, Type III NGOs were mostly concerned with ecological restoration and thus had the least number of design principles (Section 4.3.4). This meant that there was a greater variation in the co-occurrence of design principles.

However, it is important to note that these distinctions only occurred in 4 of the 12 identified principles (harvesting rights, proportional benefits, conflict resolution and graduated sanctions). This was because all the other principles were present for all NGOs.

5.1.5 Rationales and difficulties influencing NGO interventions

NGOs suggested that internal and external influences that drove their interventions included outmigration, the need to balance community aspirations against conservation goals, difficulties in enforcing measures across every individual and access to funding.

Perhaps the most interesting outputs of this research are certain interesting trends that emerged from the considered data (Section 4.2). NGOs indicated that there was a distinct

need to balance community aspirations against sustainable forest management. Indeed, these aspirations have led to outmigration of community members from villages to city areas, especially for the youth. These factors led to the loss of traditional knowledge about the resource base and reduced community management capacity. Additionally, it left communities vulnerable to exploitation. Some NGOs even described local communities as "stuck in-between" traditional ways of life and the dreams of modern existence.

To counter these challenges, NGOs attempt to provide alternative livelihood options to attract youth and decrease outmigration. They hope that providing economic incentives derived from forests will convince community members to remain in the villages and incentivise them to sustainably manage resources. Thus, they work with village institutions to reach as many members as possible and promote collective action while trying to improve forest quality. However, they felt that it was difficult to enforce sustainable harvesting methods and similar interventions among every single person of the community, although a majority did adopt them.

Additionally, NGOs felt that external disturbances such as the COVID-19 pandemic often had negligible or even positive by offering opportunities to raise awareness on the benefits of forest conservation. By hiring and training local residents and community members to be part of their ground staff in working areas, NGOs were able to continue engaging with communities despite lockdowns and other obstacles. However, NGOs were concerned about the impact of these disturbances on funding, which they termed a key limiting factor in carrying out interventions.

5.1.6 Lack of difference between Narrative and Overview lenses

There was a little difference between the narrative and overview Theory of Change approaches in any given case.

Additionally, the difference between the two lenses was starker in the case of design principles (Section 4.2.1.1.). This can be explained by the fact that some planned interventions were mentioned during interviews which were not reported within available NGO documentation.

5.2 Contextualising results with current scientific literature

The results of this study are similar to other studies carried out in similar landscapes; especially in describing how NGOs intervene in forests and their application of design principles.

In terms of interventions, NGOs do mobilise communities, build their capacity and secure their livelihood, as mentioned by Barnes (2017), Barnes and van Laerhoven (2015), Gupta et

al. (2020), and Roy et al. (2018). However, this study found that they also played a major role in helping to conserve or revive the forest base. NGOs also provided technical support and played an important role in bridging community and government stakeholders, similar to studies by Gupta et al. (2020), Gupta and Koontz (2019), and KimDung et al. (2016). As Brass et al. (2018) found, NGOs were highly keen on participatory development in some form. NGOs also viewed the landscape as a cohesive, interconnected whole and tailored their interventions accordingly, as argued by Bawa et al. (2007).

Many studies also focussed on NGO influence on the formation and functioning of community institutions (Barnes et al., 2017; Bawa et al., 2007; Wright & Andersson, 2013). In agreement, this thesis found that NGOs do attempt to form community institutions and interact with existing ones. Further, they try to strengthen community institutions by increasing participation and building capacity, as found by the studies mentioned above.

In terms of design principles NGOs do attempt to foster accountability, defend community rights to the resource, democratise community governance and increase participation, promote autonomy and local identity ties and knowledge and create nested organisations, as suggested by Brass et al. (2018) and Villamayor-Tomas and García-López (2018).

NGOs also utilised design principles while trying to counter the influences of factors like tenure rights on forest CPR management. These included socio-economic status and gender, low participation, tenure rights, governance structures, government support to the community, unfair benefit sharing, and external pressures (Baynes et al., 2015; Gebreegziabher et al., 2021; Persson & Prowse, 2017). Additionally, NGOs do not seem to consciously apply design principles although their activities are aimed to promoting a majority of them (Barnes, 2017; Barnes & van Laerhoven, 2015).

However, there were some distinct differences. Most studies considered NGOs to be external actors (Barnes, 2017; Barnes & van Laerhoven, 2015; Gupta et al., 2020; Rahayu et al., 2020; Roy et al., 2018). In this study, the position of NGOs seemed to change from external to boundary actors as interventions progressed. This could be seen in the way that NGOs concentrate on social capital and trust building to connect with communities in early stages and the way they mediate between communities and other (government, market) actors in later stages. These lines are further blurred when NGOs begin to employ local community members to implement their interventions.

Few studies also addressed the difficulties NGOs faced in applying interventions. The results of this thesis made clear that while NGOs were careful about selecting working areas (Barnes, 2017; Gupta & Koontz, 2019), local politics often drive community acceptance of NGO interventions.

Finally, while some argue that resource characteristics like size should be taken into account (Agrawal, 2001; Baggio et al., 2016), it was interesting to see how the quality of the resource

drove NGO interventions. This was especially true in the case of Type III NGOs, although most Type I and II NGOs were invested in ensuring the forest was restored. As forest CPRs in the region could often be degraded, NGOs felt that it was necessary to first revive the resource and community connections to it before focussing on how the community could manage it.

5.3 Reflection on methods and limitations

This section first discusses the strength of the methods used to sample, collect and analyse data. It then describes some of the limitations experienced over the course of the study. Potential avenues to overcome these limitations are discussed in the next section.

The snowball sampling method used to identify NGOs allowed for quick trust-building with the NGO respondent. This led to in-depth interviews and the collection of rich data. It was especially useful in helping to understand NGO motivations, as NGO were eager to share reasons behind their interventions.

Further, data was analysed using a Theory of Change approach to understand NGO interventions before comparing them against design principles found in scientific literature. Using its two lenses – the narrative and the overview - enabled data triangulation, with both interview and documentary sources, to increase the validity of the results while leaving room to compare the two. The Theory of Change approach provided a deeper understanding of each aspect of NGO interventions (outputs, outcomes and impacts) and in connecting the different aspects to various design principles.

However, there were a number of limitations that influenced this study. Many were due to the global COVID-19 pandemic and the resulting socio-political considerations in the study area. In-person fieldwork was rendered impossible and data collection was solely through digital methods. It was also difficult to follow up with NGOs to confirm the results of the data analysis.

These technological, time and resource limitations mean that this study mostly relies on self-reported data from NGOs respondents. This means that the information is likely to be heavily biased in the NGOs favour. Although interviews were designed to minimise this flaw, it is unlikely that the bias is completely removed. This study reflects forest CPR systems as NGOs perceive them to be, rather than the reality of the system from other actors' viewpoints. Thus, it is difficult to predict the effects of interventions in reality. Lastly, there may have been bias in the assignment of design principles. Therefore, the reasoning behind the assessment is provided in the appendixes.

Second, there is no complete typology or list of NGOs available in India, making it difficult to craft a representative sample. Additionally, there may be a selection bias that results from snowball sampling. It is necessary to keep in mind that other types of NGOs may also

influence forest communities such as international NGOs, educational NGOS, etc. NGOs also had varied amounts of available documentation, which the study attempted to balance by proportionally increasing the amount of interview time with those NGOs who had the least amount of written information.

Third, the framework used for data analysis provides a static snapshot of forest CPRs and NGO interventions. While this is useful to gain an in-depth idea of NGO interventions at a given point of time, NGO interventions clearly evolve to match their working areas. Adopting a cross-temporal analysis might allow further insights into NGO activities.

Finally, time and resource considerations meant that not all NGOs activities were reported and that this study focussed only on one geographic area (although different forest types were covered). Thus, it is difficult to make generalisations based on this study alone. The next section suggests potential ways in which these limitations could be addressed in future studies.

5.4 Implications and avenues for future research

This section discusses some implications of this thesis for forest governance studies and commons literature as well as for NGOs and other practitioners, especially in the Global South and beyond.

For scientific studies, it is clear that NGO actors should be viewed as dynamic, evolving entities whose positions change based on the stage of intervention. NGO activities often feed into and complement each other. Therefore, it is necessary to consider NGO actions in all spheres related to the community and not just in conjunction with the forest CPRs. Finally, the difficulties NGOs face and the reasoning behind their interventions should be taken into consideration as it affects how they carry out their activities and ultimately, their impact on the system. By doing so, science may be able to build sets of potential interventions connected to different design principles that NGOs can then utilise (with adjustments to fit the local contexts) to enable better on-ground management of forest CPRs.

With regards to NGOs and other practitioners, it is clear that framing interventions on the basis of design principles might be a good way to promote collective action in forest CPRs. However, which design principles are utilised and in which configuration should be carefully chosen based on the local contexts of working areas.

This thesis refrains from making concrete recommendations due to the limitations mentioned in the previous section. Chief among them is that this study relies heavily on self-reported data from NGOs. Considerations due to COVID-19 measures rendered in-person fieldwork impossible. Thus, this study could not verify the on-ground success of reported NGO interventions.

Future research is required to address such limitations and deepen our understanding of NGO interventions. In person fieldwork is necessary to confirm the success of these NGO interventions and complement the findings presented here. Additionally, including more stakeholders in this analysis – community members, donors, and government officials – may provide further insights into the effectiveness of NGO actions as well as clarify how these actors interact. Finally, widening the temporal and spatial scales of analysis might enable a deeper understanding of how NGOs evolve and adapt to changing circumstances. This could be done by considering all NGO activities from founding to the present or by increasing the number of cases under study.

6. Conclusion

This thesis sought to describe how and why NGOs intervene in forest CPRs, with a focus on the Western Ghats of India. It also attempted to connect these interventions to conditions scientific literature considers essential to the collective, sustainable management of forest CPRs. To do so, it asked, *How do NGO interventions within forest common pool resources in the Western Ghats compare with scientific literature on successful collective action?* In order to answer this question, this study sought to identify conditions required for successful collective action according to scientific literature, study the interventions and activities NGOs employ within forest CPRs and the rationales behind them, before matching the two to find which of the identified conditions are employed by NGOs.

What are the conditions for successful collective action according to scientific literature? Using an in-depth literature study, this thesis identified 12 conditions or design principles that scientific literature considered important to ensure successful collective action to sustainable manage forest resources. These included clearly defined harvesting rights, clearly defined boundaries, appropriation rules related to local conditions, benefits proportional to inputs, majority participation, accountable monitors, graduated sanctions, accessible conflict-resolution mechanisms, external recognition of communities' rights, nested enterprises, social capital, and appropriate leadership and community capacity.

What interventions and activities do NGOs employ to achieve their aims within forest commons? In order to address this question, this study used a Theory of Change approach to code data from semi-structured interviews and documents of 10 NGOs active within the Western Ghats, India. NGO interventions can be broadly divided into 13 programme areas, with certain general programmes under them. Programme areas included Biodiversity Management, Alternative Livelihoods, Tenure Interventions, Capacity Building, Awareness Building, Advocacy, Communication, Water Management, Research, Health, Climate Change, Networking and Funding. However, the extent to which NGOs are active in these areas depends on their stated objectives. Accordingly, NGOs that were considered by this study were classified into three types. Most NGOs had interventions related to biodiversity management, community capacity and awareness building, and advocacy. The least number of NGOs were interested in tenure interventions and watershed management.

The outputs of these interventions also varied depending on the NGO type and the stage of NGO intervention. However, there were some common outputs across all NGOs and all programme areas. These were trainings, exposure visits, use of various outreach materials, interactions with local community institutions and working with government officials. NGOs also focussed on building various capacities of community members, providing the community with income sources and easing community relations with government agencies, especially the Forest Department. The main impacts of these NGO interventions were conserving and improving the forest resource base, enabling communities to

sustainably manage their resources, raising awareness and securing community livelihoods. Many of the interventions were tightly connected to each other. For example, interventions under biodiversity management also enabled alternative livelihoods to take place.

What is the rationale underlying these NGO interventions and activities? By simultaneously analysing interview and documentary data for reasons and challenges that inform NGO activities, this thesis was able to uncover some of the rationales underlying NGO interventions. Recurring themes included the need to balance community aspirations against sustainable forest management, incentivising communities to promote collective action and conserve forests, and the need to counter outmigration of community members, especially youth, from villages to cities. With regards to challenges, the unwillingness of the community to participate in forest management, friction with government departments and difficult terrain were common themes.

Finally, the above results were used to answer the overarching research question stated above, *how do NGO interventions within forest common pool resources in the Western Ghats compare with scientific literature on successful collective action?*

To answer this question, NGO interventions visualised in Sub-question 2 and 3 were coded against the principles identified in Sub-question 1. It was found that NGOs tend to apply almost all the conditions in some way. Social capital and community leadership were the most common principles used. While most design principles were common throughout, the key differences lay in harvesting rights, proportional benefits, conflict resolution and graduated sanctions. Only half the NGOs applied three conditions (harvesting rights, proportional benefits and conflict resolution) while only one applied graduated sanctions.

The rationales and challenges that were studied in Subquestion 3 drove the extent to which NGOs adopted various design principles. The need to incentivise and attract communities towards forest conservation and collective action explains why social capital was a popular goal. Additionally, community capacity building and leadership were utilised as NGOs felt that community self-sufficiency was necessary for long term sustainable resource management. NGOs mostly refrained from applying harvesting rights, proportional benefits, and conflict resolution because they felt that those were best decided by the community and did not want to interfere in internal community structures. With harvesting rights, NGOs with interventions targeted at securing community tenure rights were more likely to adopt it than NGOs whose interventions did not.

The results of this study suggest NGOs interventions, while reflecting design principles, are informed by local contexts, internal influences and external communications. By studying such NGOs, science may be able to build sets of potential interventions aimed at fostering design principles within forest CPRs. It may enable academics to provide NGOs with science-based advice on the best course to promote on-ground collective action. NGOs could benefit by using the design principles to better structure their interventions to cover all

aspects required for community management of forest resources. By connecting interventions explicitly to scientific literature, NGOs may be able to access new funding streams and thereby mitigate one of their key challenges.

This thesis is simply a start on comparing practical, on-the-ground work to scientific literature to better merge the two. In future, studies complementing this thesis with field work involving community perspectives and expanding the geographic area and number of NGOs studied will be required. It is hoped that such efforts might eventually lead to a database that can be used by both scholars and NGO practitioners to better understand how best to manage forest common pool resources.

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Appendix A: Interview guide

The following are questions that were used to guide the semi-structured interviews with NGO respondents:

1) How many projects are you currently undertaking?
2) What are the activities under these projects? *(interventions)*
3) For each activity:
    i. Why do you do it?
    ii. How do you do it? *(outputs)*
    iii. Do you see any effects currently? If so what are they? *(current outcomes)*
    iv. Have you seen any effects before? If so what are they? *(past outcomes)*
    v. What are the final result you want to see? *(desired outcomes)*
    vi. Do these effects impact only the forest or do they also affect the people living/dependant on it? If so how? *(environment, economic, social outcomes)*
4) What is the overall impact you wish to have on the forest? *(impacts)*
5) Have you felt the need to change your approach over time? If so why?*(disturbances)*
6) Are there general remarks you would like to share with me?

Appendix B: NGO interventions – outputs, outcomes, impacts, reasons and difficulties

Appendix B1: Type I NGO interventions

			*
Environmental	Economic	Social	Planned activities

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Biodiversity Management					
Nurseries	1. Nurseries [3] 2. Raise native and NTFP species saplings [3] 3. Training [3] 4. Exposure visits [3]	1. Capacity building of forest officials [3] 2. Income for individuals who run nurseries [3] 3. Increase community access to forest products [3]	1. Reduce pressure on forest [3] 2. Promoting native species [3] 3. Community conservation of useful species [3] 4. Increase community livelihood options [3]		1. Difficult to raise saplings during drought years [3]
Seed conservation	1. Seed bank [3] 2. Seed exchange programmes [3] 3. Planting material procurement [3] 4. Traditional Food & Seed Festivals [2,3] 5. Formal and informal discussions [2] 6. Demonstrations [2] 7. Trainings [2]	1. Community celebrates local seed varieties [2,3] 2. Seeds accessible to farmers [3] 3. Farmer networks to share seeds [3] 4. Farmers cultivate local seed varieties and traditional crops [2,3]	1. Biodiversity conservation [2] 2. Strengthening village level seed banks [3] 3. Promotion of traditional food [2,3] 4. Local food sovereignty [2] 5. Community health [2]	1. Traditional, local crops can enhancing community food security and farmers' sovereignty by promoting [3]	
Tree planting **Ecological restoration** **Agroforestry** **Invasive species management** **Working on coffee estates**	1. Planting saplings/ seeds of native/ rare/ NTFP species [1*,3] 2. Landscape revival plantings on coffee estates [3] 3. Leveraging Government schemes to plant trees [2] 4. Wetland & Spring restoration [3] 5. Revival of fallow lands [3] 6. Weed removal [1*] 7. Research [3]	1. Increased income for community from NTFPs [1*,3] 2. Increased income for community from labour [2] 3. Farmers grow commercial cash crops for better income [3] 4. Decipher the habitat condition, resilience, threats and restoration measures [3]	1. Increase forest cover and help conserve soil [1*,3] 2. Protect and restore ecosystems and biodiversity [1*,3] 3. Regenerate degrading landscapes [1*,3] 4. Improve the water quality [3] 5. Ensure constant provision of ecosystem services essential for the wellbeing of communities, wildlife & the environment [2,3] 6. Ensure community livelihood [1*,3] 7. Improve crop production for farmers [3] 8. Reduce human-animal conflict [1*]	1. Unsustainable land use is widespread and growing in the region. Land-use changes, rapid urbanization and agriculture intensification have caused a considerable reduction in biodiversity [3] 2. By making the forest healthier, NTFP collectors will be able to get a livelihood [1*, 3]	
Management Plans	1. People's management plan [1*] 2. Microplans [2] 3. Conservation and management plan [2,3] 4. Negotiation with Forest Department [2,3] 5. Community Forests Sustainable Management Plan [3]	1. Community management of forests [1*,2,3]	1. Increase forest cover [1*,3] 2. Regenerate degrading landscapes [1*,3] 3. Reduce human-animal conflict [1*]	1. Indigenous people have a symbiotic relationship with the forest. Their knowledge is a needed asset to conservation. They are not destroyers but protectors as they have a religious relationship with the forest. Therefore by including them in forest management, biodiversity will improve. [1*] 2. By making the forest healthier, NTFP collectors will be able to get a livelihood [1*, 3]	1. There is a lot of friction between indigenous communities and the Forest Department, thus the people's management plan was not accepted. [1*] 2. The implementation of management plans as these are not valid unless the tenure claims are granted under the Forest Rights Act [2]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Conservation agreements	1. Feasibility analysis [3] 2. Baseline data collation [3] 3. Mapping land-use [3] 4. Focus group discussions [3] 5. Short surveys [3] 6. Identify regional conservation goals and the potential challenges [3] 7. Conservation Agreements [3] 8. Interaction and information sharing platform [3] 9. Set of rules [3] 10. Sanctioning [3]	1. Exchange conservation initiative ideas with the resource users and stakeholders [3] 2. Negotiate with the community to conserve natural resources [3] 3. Community understands and consents for conservation agreements [3] 4. Harvesters to reduce indiscriminate harvesting [3] 5. Farmers and NTFP gatherers in the region receive benefits from the project if they adhered to conservation practices [3] 6. Increasing stakeholder participation [3] 7. Documentation of regional demographics and landscape [3]	1. Community conservation of resources [3] 2. Meeting community requirements like education, health, and infrastructure [3] 3. Understand community types and their resource use [3] 4. Inclusive agreements governed by the village gram sabhas [3]	1. Conservation tool for community-driven conservation [3]	
Managing human wildlife conflict	1. Stakeholder workshops [3] 2. Sign boards at intersections [3] 3. Water holes for animals in dry season [3] 4. Exposure visits [3] 5. Animal Monitoring App [3] 6. Effective and low maintenance barriers [3] 7. Mapping animal movements [3] 8. Documenting people's perceptions [3]	1. Contribute to scientific knowledge of human-animal interactions and animal behaviour at different levels [3] 2. Sharing knowledge among communities and associated institutions [3] 3. Behavioural change in the community towards wildlife [3] 4. Involve local people in mitigating interactions between humans and animals [3] 5. Increased community awareness [3]	1. Ensuring safety for humans and wildlife [3] 2. Reduces crop damage [3] 3. Influence land use planning. [3] 4. Developing information to understand how to reduce wildlife-human conflict at water sources [3]	1. With increasing attention towards negative interactions between humans and wildlife, understanding the nature of these interactions has become crucial in rapidly urbanising landscape Community ideas could help mitigate the human-animal conflict	
Monitoring **Community monitors/Stewards**	1. Identify people [3] 2. Trainings [3] 3. Survey [3] 4. Equipment provided [3] 5. Community monitors [3] 6. Clear transparent information sharing [3]	1. Stakeholders (community and government) share and discuss information [3] 2. Capacity building of community [3] 3. Community can ecologically monitor their forests [3] 4. Community monitors decide on conservation education activities, forest nurseries and human wildlife conflict issues [3]	1. Create a community based ecological monitoring program [3] 2. Monitoring and understanding of agro-forestry, wild forest, wildlife movement [3] 3. Better information collection [3] 4. Increase transparency for the NGO [3]		
Alternate Livelihoods					
Apiculture	1. Trainings and workshops [2,3] 2. Meetings and discussions [2] 3. Follow-up sessions [2,3] 4. Hygienic and sustainable honey collection and beekeeping programme [2,3] 5. Management plans [2] 6. Fabrication and supply of tools, equipment, etc. [3] 7. Processing centres	1. Capacity building of community in beekeeping [2,3] 2. Increase community demands for training and equipment [3] 3. Community run apiaries [3] 4. Community awareness raised about importance of bees [2,3] 5. Generates revenue for NGO through sale of equipment [3]	1. Sustainable and efficient honey harvest [2,3] 2. Understand the causes for bee population decline [2,3] 3. Bee conservation and habitat revival [2,3] 4. Increase of feral bee populations [2] 5. Ensure better fruit setting and harvest [3]	1. Groups of traditional honey harvesters within each village, collect honey from honeybee wild colonies. It is a common livelihood source. However, traditional methods can become unsustainable due to overharvest [2,3] 2. Bees are important forest pollinators. Due to habitat degradation, bee populations have declined [2]	1. Diseases, pesticide poisoning, elephant, bear and wild boar attacks lead to loss of colonies [3] 2. Climate change affects flowering and causes bee migration due to lack of nectar and pollen, making it difficult to replace lost colonies [3]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	8. Conservation agreement with farmers [2] 9. Knowledge repository [3] 10. Awareness campaigns [2] 11. Short films [3] 12. Honey festival [2] 13. Village bee centres, pollinator conservatory and apiaries [3] 14. Honey networks [2] 15. Honey enterprise [2] 16. Participatory research studies on bee conservation [2]	6. Better price for honey for community [1,2,3] 7. Marketing & selling honey by women's SHGs [2] 8. Contributing knowledge resources for students, farmers, indigenous communities, service agencies, social enterprise groups, environmentalists, and policy makers [2,3]	6. Promote apiculture and its various benefits [2,3] 7. Increased livelihood [1,2,3] 8. Create a pool of indigenous and scientific knowledge for better natural resource management [3] 9. Generate awareness on importance of bees [3]	3. Beekeeping is thus an ecologically & traditionally appropriate form of income generation for indigenous communities. Endorsing beekeeping can increase production of organic honey [3] 4. Sustainable methods will protect and increase the bee population of critical importance for maintaining biodiversity [3]	3.
Agriculture	1. Trainings [2,3] 2. Exposure visits [2,3] 3. Supply of equipment and material [3] 4. Loans [3] 5. Mobilizing government schemes [2,3] 6. Farm plans [3] 7. Research [3] 8. Organic certification process [3] 9. Survey of farmlands and land use maps [3] 10. Purchase and sale of farm produce [3] 11. Value addition [3] 12. Flyers [2]	1. Farmers take up fallow lands and grow organic produce [1,2,3] 2. Farmers establish coffee gardens and cultivate crops like paddy etc. [1,3] 3. Financing ploughing and seed procurement for farmers [3] 4. Skill development and capacity building of community members [2,3] 5. Communities better understand the concept of organic agriculture and the benefits of certification [3] 6. Foster community efforts to organise farmers' groups [3] 7. Farmers support each other with shared resources [3] 8. Increased community incomes [3]	1. Revive organic and traditional farming [1,2,3] 2. Soil rejuvenation and land clearing after disasters [3] 3. Intensive agriculture on fallow lands of traditional and commercial crops [3] 4. Biodiversity conservation [2] 5. Mitigate climate change [1] 6. Understand agricultural situation and challenges [3] 7. Increased community livelihood [1,2,3] 8. Help local communities revive traditional occupations that make them self-sustaining [1,2,3] 9. Local food sovereignty [2] 10. Improve community health [2] 11. Revive existing farmers' groups [3]	1. Traditionally, the indigenous communities practiced organic farming. In recent times, the government has promoted conventional agriculture as part of development schemes, leading to financial and ecological troubles [1]	1. Work is greatly hampered by local security issues [1] 2. In some areas, there is conflict with elephants. This is true for food crops. Sometimes, indigenous communities accept this, and at others a conversion to cash crops proves beneficial [1,3]
NTFP collection and value addition	1. Training on value addition, NTFP processing and management, sustainable harvest at different levels [2,3] 2. Development of harvest guidelines [3] 3. Formalising NTFP harvests [1*] 4. Village enterprise and NTFP micro processing units [3]	1. Sustainable NTFP harvest by community [2,3] 2. Community can process and value add locally available NTFPs [1*,3] 3. Capacity building of communities, especially women [2,3] 4. Increased income for communities [1*,2,3]	1. Sustainable NTFP harvest [2,3] 2. Better economic status and community livelihood [1*,2,3] 3. Women's empowerment [2,3]	1. Communities in the region are forest dependent with a little seasonal agriculture. They are vulnerable to exploitation. By providing livelihoods within the village, people do not have to leave the village for work, especially women [3] 2. If communities are allowed to collect NTFPs, they will be able to better manage the forest [1*]	
Marketing	1. Trainings [2,3] 2. Large Scale Marketing Wing [3] 3. Marketing products [1*,3] 4. Label printing, packaging etc. [1*]	1. Capacity building of communities on pricing and maintaining registers [3] 2. Co-operative selling of produce by women, community members [2,3] 3. Increased income for communities [1*,2,3]	1. Better economic status and community livelihood [1*,2,3] 2. A fixed marketing platform will provide the community financial security [3] 3. Encourage community to continue their traditional practices [1*,3]		1. Marketing is currently a problem. Most of the profits go to agents and the real collectors do not get any money [1]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Farmer Producer Organisation	1. Farmer Producer Company [1,2,3] 2. Inclusive members' and ownership list [3] 3. Distribution of shares [3] 4. Discussion and meetings at different levels [1,3] 5. Value addition centres [3] 6. Training [3] 7. Exposure visits [3] 8. Packing [3] 9. Product Development [3] 10. Creating market linkages [3]	1. Community run producer company (as stakeholders) [3] 2. Resolutions in village meetings in favour of joining company [3] 3. Capacity building to manage accounts and streamline the company [3] 4. Community can process and value add locally available NTFPs [3] 5. Increased income and employment to the community [1,2,3] 6. Profit sharing amongst community members [3] 7. Community able to solve issues drinking water, housing, etc. [1] 8. Community members gain self-confidence [1] 9. Increased cooperative and collective efforts [1]	1. Economic benefits and employment to the community [1,2,3] 2. Micro-enterprise development in the local villages [3] 3. A fixed marketing platform will provide the community financial security [3] 4. Greater bargaining power to the community [1,3] 5. Community rights gained [1] 6. Encourage community to continue their traditional practices [1,3]	1. Empowerment of certain groups and the whole community to participate in local governance decisions must be accompanied with livelihood enhancement [2]	
Ecotourism	1. Trainings [2] 2. Operationalization of eco-tourist lodge [2] 3. Plastic clean up drive [2] 4. Research [2] 5. Ban on hunting/harmful harvesting practices [2]	1. Ecotourism activities owned and managed by villagers [2]	1. Community based eco-tourism management [2] 2. Increased community livelihood [2] 3. Enhanced ecological security [2]	1. Tourism led to environmental pollution, wildlife disturbance, and illegal construction. Non-locals were benefitted the most [2]	1. Little support from villagers and local forest administration [2]
Lantana furniture	1. Trainings [1*]	1. Increased income for communities [1*]	1. Increased community livelihood [1*]		
MGNERGA	1. Liaising with government [2,3] 2. Gram Sabha discussions [2] 3. Exposure visits [2] 4. Job cards and zero balance bank accounts [2]	1. Villagers started contributing a day a week towards common village activities [2] 2. Employment for villagers [2,3]	1. Planting of trees [2,3] 2. Employment opportunities for local communities [2,3] 3. Increased community livelihood [2,3]	1. Empowerment of certain groups and the whole community to participate in local governance decisions must be accompanied with livelihood enhancement [2]	1. Lack of cooperation from the bank officials and local administration
Other skills	1. Trainings [3] 2. Supply of tools and equipment [3] 3. Rural Skill Learning Centre [3] 4. Grassroots organisations [3]	1. Building and supply of machinery and tools for other programmes by community [3] 2. Sustainable harvest by community [3] 3. Capacity building of community for value addition of NTFP [3] 4. Skill development of rural youth and women [3] 5. Space for trainings, and trade practice [3] 6. Enhanced production of value added products [3] 7. Sharing of knowledge among and between communities [3]	1. Build community capacity for appropriate technologies [3] 2. Emancipation of poor and underprivileged people [1] 3. Better economic status for local communities [1] 4. Foster sustainable livelihoods and social enterprise development [3] 5. Promote natural resource conservation [3] 6. Improve quality of life and environment among rural communities [3] 7. Promote efficient use of human labour, cost effectiveness, grassroots relevance use of renewable energy [3]	1. Try to help extremely displaced and alienated tribal populations [1]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
			8. Network and sharing of information [3] 9. Equipping communities' critical consciousness and enabling them to take charge of their own development [1]		
Tenure Interventions					
Filing claims	1. Trainings and workshops for community and government [2,3] 2. Exposure Visits [1,2,3] 3. Model villages [3] 4. Filing Individual and Community claims under the Forest Rights Act at different levels [1,2,3] 5. Village level forum to discuss FRA and follow up on claims [2,3] 6. Meetings between Forest Department, local bureaucracy and villages [2,3] 7. Liaising with government officials [2] 8. Forming Forest Rights Committee [2]	1. Recognition, confirmation and claiming of individual and community forest rights claims by the government [1,2,3] 2. Capacity building of village groups to gain rights over their land and liaison with the government and leverage available schemes and provisions for strengthening their livelihoods [1,2,3] 3. Communities and government interact, raise questions and clarify their queries concerning Forest Rights Act [3] 4. Increasing community awareness [2,3] 5. Community democratically makes decisions [2] 6. Villagers agreed to areas being declared critical wildlife habitat contingent on the government support [2] 7. Villagers were developing a sense of ownership over the community forest resource [2] 8. Communities fight malpractices such as corruption or opaque decision-making processes [2]	1. Implementation of Forest Rights Acts [1,2,3] 2. Ensuring community rights over the forest resource [1,2,3] 3. Example to other villages on how Forest Rights Act functions [2,3] 4. Wider policy changes based on the success of this intervention [2] **5. Equipping indigenous communities to sustainably manage healthy forests with improved biodiversity [1*,2,3]** **6. Reduction in human animal conflict by ensuring food and fodder in the forest [1*]** 7. *Strengthen community governance processes [1,2,3]*	1. Local indigenous communities were dependent on natural resources for their subsistence However, their access rights to the forest had been restricted [1,2] 2. The level of external support or intervention was low with much friction with government authorities that dates back to colonial forest management system [1,] 3. The Forest Rights Act allows people to protect, regenerate and manage community forests [1] 4. Working within the same geographic region with contiguous forests makes it easier to work towards a community based landscape [2]	1. While Individual Forest Rights are easily claimed, obtaining Community Forests is difficult [3] 2. Land issues cannot be tackled easily. It is a long process that is hindered by friction with the government, violence, local politics, factionist tendencies, outside interference and external factors like elections, natural disasters or the COVID-19 pandemic [1,2] 3. Complicated processes deter communities from actively claiming their rights and corruption, especially in the Forest Department, hampers devolution of power to village communities [1,2] 4. Progress was lost as conflicts arose within the community or between the government and the community [2] 5. Slow progress hinders the implementation of management plans as these are not valid unless claims are accepted [2] 6. Earlier attitudes of helplessness and frustration among the villagers return due to such setback [2] 7. Villagers were afraid of claiming their rights as they felt that such information would be used by the Forest Department to prove that these communities were damaging the forest and, hence, evict them [2]
Mapping	1. Supply of GPS units [1,3] 2. Training [1,3] 3. Participatory research to map areas [2,3] 4. Android app for field data collection and online visualisation platform [3] 5. Map of farms, land use maps [3] 6. Verification of village boundaries 2,[3] 7. Marking of perimeters [3] 8. Providing access to existing maps and records [2]	1. Building capacity of community members, volunteers and staff on mapping and GIS [1,3] 2. Communities map their traditional boundaries and resources, along with the geo-referencing [1,2,3] 3. Increased Forest Rights Committee capacity to understand land use changes and resource availability [2,3] 4. Capacity building of village groups to gain rights over their land and strengthen livelihood [1,2,3] 5. Increased community understanding of natural resource availability [2,3] 6. Forest Rights Committee identifies of fallow lads for cultivation [1,3] 7. Quickly produce maps for government with reference markers [3]	1. Enable Forest Rights Act claims [1,2,3] 2. Understand community resource base [2,3] 3. Equipping communities for sustainable forest governance [1,2,3] 4. Supports decision making by village communities and other stakeholders [2,3] 5. Provide a model of a fast, easy mapping method and analysis without software [3]	1. Mapping is a prerequisite for claiming conservation and management rights under the Forest Rights Act [2,3] 2. Traditional boundaries have been fixed, but not formally mapped [1]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Others	1. Trainings [2,3] 2. Exposure visits [1,3] 3. Model villages [3] 4. Documentation of community governance processes, Forest Rights Act violation [2] 5. Reports [2] 6. Management and conservation plans [2,3] 7. Joint patrolling with the government [2] 8. Support to governmental offices [2] 9. Meetings between community and government functionaries at different levels [3] 10. Banners and letter heads [3] 11. Advocacy film [3]	1. Share findings from the field among other NGOs and stakeholders [2] 2. Increasing community awareness [2] 3. Building capacity of village groups to gain rights over their land and liaison with the government and leverage available schemes and provisions for strengthening their livelihoods [1,2,3] 4. Emphasize the onus of the committee members to call for consultation meetings, maintain proper records, guide the community to submit claims and lead the post-submission process [2]	1. Documenting and analysing implementation of Forest Rights Act [2] 2. Counter the notion that community rights are detrimental to the forest [2] 3. Strengthening of Gram Sabhas [1,2,3] 4. Equipping communities for sustainable forest governance [1,2,3] 5. Supports decision making by village communities and other stakeholders [2,3]	1. Local governance institutions were weak with limited community interest in conservation and development. There was a need for outreach to villagers, making them realise their rights to the resource base [2]	(See row above)
Capacity Building					
Strengthening village institutions	1. Forming Gram Sabhas [3] 2. Forming Forest Rights Committee [2] 3. Forming Village Eco development Committee [2] Strengthen Gram Sabha [1,3] 4. Community (youth, women) groups [2,3] 5. Working with other village institutions [3] 6. Implement Eco-Village Development scheme [2] 7. Workshops and trainings [3] 8. Exposure visits [1] 9. Opening communication channels between and among stakeholders(community, government) [2] 10. Common platform to discuss Forest Rights and Natural Resource Management [3] 11. Resource use rules [2] 12. Documentation [1] 13. Festivals [2] 14. Funding [1]	1. Capacity building of government officials, community and NGO personnel [1,3] 2. Community develops documenting and accounting skills [1,3] 3. Community members form groups and institutions [2,3] 4. Women feel more empowered and have increased participation in governance [2] 5. Community members engage in increased collective action and decision making with increased participation in the Gram Sabha [2,3] 6. Community leadership [1,2,3] 7. Community demands for community resource rights [2] 8. Forest Rights Committee members have discussions at various levels [3] 9. Forest Rights Committee frame and communicate rules for resource use [2] 10. Community devises management plans [1,2] 11. Village agrees to its surrounding areas being declared as critical wildlife habitats by Forest Department in exchange for external support [2]	1. Strengthen village institutions and groups [1,2,3] 2. Increase community participation and leadership [1,2,3] 3. Increase collective thought and action in forest governance and local development [2] 4. Enhancing community's sovereignty and financial security [1,3] 5. Increase community's capacity and understanding and enable them to manage resources and take informed decisions [1,2,3] 6. Strengthen the process of claiming rights under the Forest Rights Act [2,3] 7. Women empowerment [2]	1. The Gram Sabha is the village assembly where all villagers above the age of 18 can be involved and where the community can take its decisions [1,2,3] 2. The Gram Sabha's decisions are binding under law and cannot be interfered with by external authorities [1]	1. Progress takes time and is often non-linear. Gains are lost for many, difficult to predict reasons [1,2] 2. Systemic lethargy and corruption, especially in the Forest Department, hampers the process of devolution of power to the village communities. A lack of support from the Forest Department and other government officials leads to loss of progress [1,2] 3. The Forest Department's actions often created divisions within the community [1,2] 4. Factionist tendencies in the communities (which are typically divided along mainstream political party lines, socio-economic class and gender) make collective action difficult [2] 5. The national climate of economic neoliberalisation and privatization of natural resources is antithetical to the idea of community owned resource governance and conservation and is an hindrance [1,2,3]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Village Savings	1. Surveys [2] 2. Job cards and zero balance bank accounts [2] 3. Village Savings Group [3] 4. Organise bank accounts for Gram Sabha [1]	1. Community members form groups and institutions [2,3] 2. Capacity building of community [1,3] 3. Community develops documenting and accounting skills [1,3] 4. Women and youth feel more empowered and have increased participation in governance [2] 5. Increased community income [1,2,3]	1. Increase community participation [1,2,3] 2. Enhancing community and individual sovereignty and financial security [1,3] 3. Increase community's capacity 4. Enable community institutions to manage resources and take informed decisions [1,2,3] 5. Women empowerment [2] 6. *Increased livelihood opportunities* [2]	Village-level saving groups are self-sustainable and help to bring more security to each individual and build the capacity of the group as they work towards the development of their own villages [1,2,3]	
Gender Equality	1. Focus group discussions, workshops and meetings [2,3] Women village assemblies, Mahila Parishad and Gram Sabhas [2] 2. Forming Sub Division Level Committee [2] 3. Self Help and youth groups [2] 4. Trainings [2,3] Community Health Workers [3] 5. Quarterly community newsletter [3] Community Radio [3] 6. Support for women farmers [3]	1. Increase in women participation in village institutions [2,3] 2. Skill training for women [3] 3. Increase awareness of marginalised women 4. Increase in women leadership, decision making, family roles and responsibilities, community support to single women and money management [2,3] 5. Women map land and resources [3] 6. Women dismantle and picket liquor shops, file police complaints against illegal liquor sale in the forest, etc.[2] 7. Women can challenge patriarchal structures [2] *8.* Women speak out against misuse of funds [2]	1. Understand the status of roles, responsibilities and limitations related to gender within the indigenous communities and design interventions based on this [3] 2. Capacitate women from indigenous communities to achieve gender equality in matters relating to the community, resource management, decision making, health, education, etc. [2,3] 3. Enhance participation of women [2,3] 4. Encourage community initiatives to promote social cohesion, integrate social, cultural and economic realities and build knowledge [3] 5. Instil enough confidence in women to enable them to speak up about their issues [2,3] 6. Enable more women to empower their counterparts, and organise and mobilise [2,3] 7. Raise awareness	1. Women suffer from various forms of marginalisation in patriarchal village society, [2] 2. There is no need to promote gender equality within indigenous societies; women will do whatever men do. They do activities together in joint partnership [1]	1. Women's participation is often challenged by certain factions of village men, community members who support the agenda of some Forest Department officials, and other politically motivated groups who oppose them. These societal divisions are exacerbated by elections [2]
Others	1. Non formal school [1] 2. Exposure visits [1] 3. Liaising with government officials [1] 4. Training and workshops [1,2,3] 5. Youth groups registered as Society [2] 6. Discussions and meetings [2] 7. Arranging documentation [2] 8. Microplans [2]	1. Community groups develop a shared sense of purpose and have an active say in local governance decisions [2,3] 2. Increased participation of youth [2,3] 3. Community sharing of knowledge and finding greater strength in numbers [2] 4. Community were able to solve their own problems [1] 5. Community members gain the self-confidence [1] 6. Increased community organisation [1] 7. Skill and capacity building of youth [1, 2,3] 8. Community leadership [2] 9. Community adopts Democratic decision making process [2] 10. Community raises issues in the development processes [1,2]	1. Help community organisation [1,2,3] 2. Promote communities' advocacies on local issues [1,2,3] 3. Create spaces for all members of the community to express themselves [2,3] 4. Give women and youth ability to co-develop a shared vision for their villages [2,3] 5. Enabling people to optimise their own potential and enabling them to take charge of their own development [1,2,3] 6. Capacity building of indigenous youth in technical skills related to environment [2,3] 7. Enhance community leadership [1,2,3] 8. Build community awareness [1,2,3]	1. There is a lack of local sustainable livelihood options for the community which is more severe with the youth whose aspirations have transformed with rapid urbanization and modernization This leads to youth to become disconnected from their local ecologies and tribal lifestyle [1,2,3] 2. External support is often necessary, as collectivization and awareness levels are low [2] 3. Local communities often approach NGOs to ask for help [1,2]	1. Youth engagement is low. Young people are impacted by lack of access to quality education and meaningful employment, addictions and engagement in criminal activities. They find it difficult to secure formal opportunities to participate in local governance platforms and to gain acceptance from community elders [1,2]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Awareness Building					
Awareness building	1. School programs [3] 2. Summer camps [3] 3. Exposure visits [2,3] 4. Film festival, documentary [1,2,3] 5. Drawing and speech competitions [3] 6. Nature walks [3] 7. Door-to-door information dissemination [2] 8. Outreach material like flyers, information brochure, newsletters, briefing notes, blogs, books [2,3] 9. Awareness programmes [2,3] 10. Reports Scientific Papers 11. Interactive maps 12. Curriculum development [2,3] 13. International Google group [2]	1. Community awareness (especially among youths) about laws and their rights and other relevant subjects [1,2,3] Widespread and transparent information sharing among communities [2] Increased consensus amongst all stakeholders [2] 2. School students participate in documentation and compilation of information [3] 3. Communities feel empowered to challenge the Forest Department's top-down approaches to conservation [1,2] Guidance for other NGOs active in forest rights and management [2,3] 4. Other communities file claims under the Forest Rights Act [2]	1. Building community awareness on a variety of subjects [2] 2. Increasing participation of all groups in the governance process [1,2,3]	1. Dissemination of information with regards to rights and responsibilities must occur in different formats and at different scales to reach all relevant stakeholders [2] 2. Community awareness among youths is much needed. Unless youth feel that their traditional ways and value systems are important in this present world, these values will dissolve over time as they are not considered to be important. So there is a need to make young people understand that these are really needed as only the indigenous way of life can protect and save the world [1]	1. Awareness building and maintaining that awareness is a continuous process [1,2,3]
Conservation education	1. Curriculum development [2,3] 2. Hosting field courses in ecology, natural history and sustainability science [1,3] 3. Presentations 4. School workshops [2,3] 5. Trainings and workshops at different levels [2] 6. Exposure visits [2] 7. Flyers and information materials [2] 8. Door-to-door awareness campaigns [2]	1. Community or government owned and run school workshops [2*] 2. Facilitate knowledge transfer between communities and university/school students [2,3]	1. Promote understanding and research into the socio-ecological history of the region [2,3] 2. Develop an alternate lens to understand issues concerning environment and livelihoods [3] 3. Systematic knowledge sharing to bridge indigenous knowledge and modern science [3]	1. The youth are becoming disconnected from their local ecologies and tribal lifestyles. Youth should feel that their traditional ways and value systems are important in this present world. Thus, community awareness and education is very important [1,2,3]	1. There is a significant gap between the aspirations of the youth and the opportunities available in the villages [2,4]
Citizen Science	1. Monitoring app [3] 2. Mapping animal movements [3] 3. Documenting people's perceptions of their interactions with animals [3]	1. Local communities identify and record animals movement [3] 2. Local communities help mitigate interactions between humans and animals [3]	1. Understand interactions between humans and animals in urban landscapes, as well as the factors which could influence these interactions [3]		
Advocacy					
Policy comments	1. Local consultations and meetings [2] 2. Reports [2] 3. Workshops [2] 4. Field investigations [2] Case studies [2] 5. Correspondence with other organisations [2] 6. Coordinating other NGOs at different levels [2] 7. Policy submissions and letters [2] 8. Policy briefs [2] 9. Translated materials [2]	1. On ground legal help for communities [2] 2. Communities have improved access to materials [2] 3. Communities counter forceful evictions of legitimate forest dwellers [1,2]	1. Advocacy for democratic conservation laws, policies and practice with government officials, communities and political parties at different levels [2] 2. Documentation of co-existence [2] Documentation the challenges and struggles of women [2] 3. Challenging the exclusionary forms of conservation and building narratives of democratized and community based conservation [2] 4. Sharing of information on FRA [2]	1. There are many illegal, arbitrary and forced relocations and evictions of legitimate forest dwellers from several Protected Areas and forests in the name of development [1,2] 2. Misappropriation of foreign funds by the Forest Department to forcibly evict/cheat forest dwellers [1] 3. Attempts to establish corporate run tourism inside protected areas [1]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Lobbying/Protesting	1. Protests [1] 2. Lobbying [1] 3. Complaints and review meeting with funders [1] 4. Public interest litigation [1] 5. Right To Information applications filed [2] 6. Participating in local governance forums [2] 7. Formation of democratically active village institutions [2]	1. Communities counter forceful evictions of legitimate forest dwellers [1,2] 2. Communities prevent of fund misappropriation [1] 3. Communities prevent corporate tourism activities inside protected areas [1] 4. Communities agitate for the passing of the Forest Rights Act and PESA Act [1] 5. Participation of local community members at different levels [2]	1. Community organization and building around common interests and issues [1,2] 2. Increase transparency of development schemes [1,2]	1. There are many illegal, arbitrary and forced relocations and evictions of legitimate forest dwellers from several Protected Areas and forests in the name of development [1,2] 2. Misappropriation of foreign funds by the Forest Department to forcibly evict/cheat forest dwellers [1] 3. Attempts to establish corporate run tourism inside protected areas [1]	1. Violence from state and others Local politics is often a hindrance Friction with Forest Department hinders progress
Liaising with Government Departments	1. Exposure visits [1,3] 2. Trainings [2,3] 3. Directly liaising with government officials [2,3] 4. Communication channels between government and community [2] 5. Constructive dialogue [2] 6. Co-creating plans to link employment and forest conservation [2,3] 7. Support to government officials [2] 8. Provide equipment and materials to government departments [3] 9. Employment opportunities under government schemes [2,3]	1. Increase in community awareness [1,2] 2. Communities gain confidence to question the government officials [1,2] 3. Capacity building of government officials [2,3] 4. Facilitating discussions with stakeholders at multiple scales [2] 5. Government representatives participate in local village events [2] 6. Increase in community sustainable livelihood opportunities [2,3] 7. Access to transparent information on Government schemes [2] 8. Consensus on co-managing and conserving the forest and communal lands [2,3]	1. Reducing mistrust and hostility between government and community [1,2,3] 2. Strengthen biodiversity conservation by improving ecosystem and the management capacity [2,3]		1. Government officials have a huge stake in decisions concerning the Forest Rights Act and conservation [2] 2. Friction with the Forest Department and other government departments [1] 3. Loss in access to the forest and the fear of eviction from their lands has created a culture of distrust between the Forest Department and the community [2]
Communication					
Traditional Knowledge	1. Archive and repository of folklore and knowledge [3] 2. Community networks [3] 3. Publication and documentation [2,3] 4. Interactive sessions between village elders and children and youths [3] 5. Fellowship for community researchers [3] 6. Community media (community newsletter, Community Radio) [3] 7. Teaching-learning spaces [3] 8. Consultations [3] 9. Community-curated exhibitions [3] 10. Exposure visits [3] 11. Community Groups [3] 12. Events and festivals [2,3] 13. Promotion of local medicinal plants [1,2,3]	1. Children get practical information on traditions and practices and are able to appreciate the depth of knowledge that their elders possess [3] 2. Elders share their knowledge and receive the reverence that is their due [3] Knowledge resource centre for various stakeholders [3] 3. Indigenous culture, knowledge and art hub driven by the community [3] 4. Community groups working towards enabling and accessing local philanthropy better, and recognising their own agency and position in society [1,2,3] 5. Community celebrates their own produce and culture [2,3]	1. Promote communities' advocacies on local issues [1,2,3] 2. Create spaces for all members of the community to express themselves [2,3] 3. Revive and pass traditional knowledge between generations [1,2,3] 4. Instil a sense of respect and responsibility towards the region in future generations 5. Identify ideas and modes to highlight conservation ideals [3] 6. Promote co-existence and the different community uses of landscapes [3] 7. Create accessible and retrievable archive of knowledge [3] 8. Empower educators and attract students, researchers and public [3]	1. There is an immediate need to introduce the younger generation to traditional practices and spread traditional knowledge. Conservation of cultural practices can be done by ensuring it passes from one generation to another and has enough practitioners 2. Village elders with different skills from different regions take children into the forest and explain uses of local biodiversity. 3. There seems to be a growing disconnect of the community from its traditional customs and its local ecology, especially for the youth.	1. Challenging due to the significant gap between the aspirations of the tribal youth and the opportunities available in the villages. 2. If only one person practices or an art, the knowledge isn't passed down to the next generation and is thus lost when he dies. 3. Sometimes it is challenging to make the community come forward and express their visions or ideas

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	14. Outreach material (flyers, films) [2,3] 15. Product development and sales [3] 16. Bamboo nursery [3]	6. Medium to get the community and other stakeholders together [2] 7. Opportunity for women to assess their own abilities to organize events of such a magnitude [2] 8. Opportunity for women to earn some revenue [2] 9. Community studies and uses medicinal plants [1,2,3] 10. Income to the community [3] 11. Community can easily access needed materials in nurseries [3] 12. Community develops new artistic techniques developed [3] 13. Awareness raising on community rights [2,3] 14. Women empowerment and mobilisation [3]	9. Develop a trust-based relationship with the community [2] 10. Celebrate, perpetuate and preserve local heritage of the region [1,2,3] 11. Increase the community's ability to enhance its own health and development [1,2,3] 12. Increase the community's ability to enhance its own livelihood outcome [2,3] 13. Promote social cohesion, integrate social, cultural and economic realities and build knowledge [1,2,3] Promote communities' advocacies on local issues [1,2,3] 14. Create spaces for all members of the community to express themselves [2,3]		
Trust building	1. Social media [3] 2. Monthly e-newsletter [3] 3. Books [3] 4. Publish programme related collaterals [3] 5. Programmes documentation [3] 6. Natural History Society [3] 7. Data archive [3] 8. Spending time in villages and staying with villagers in their homes [2] 9. Dipstick surveys [2]	1. Information sharing with all stakeholders [2,3]	1. Develop a trust-based relationship with the community [2,3] 2. Understand NGO's impact [2] 3. Collect, analyse and document information produced by NGO [3] 4. Ensure information reaches the intended audience in a form that is most readily useful for them [2,3]		
Watershed Management					
	1. Baseline survey [3] 2. Exposure visit [3] 3. Eco-restoration [3] 4. Equipment provided [3] 5. GPS mapping [3] 6. Catchment delineation [3] 7. Capacity building trainings [3] 8. Educational modules and schools programmes [3] 9. Biodiversity inventory [3] 10. Stakeholder consultations [3] 11. Water Security Plans [3] 12. Resource materials [3] (calendars, posters etc.), sketches of waterscapes, short films, audio podcasts [3] 13. Community Resource Persons [3]	1. Village institutions understand the real need for springs conservation [3] 2. Communities able to plan necessary/ immediate interventions in their locality [3] 3. Trust building by NGO within other communities [3] 4. Community resource persons and NGO actively map local water resources, conduct research [3] 5. Community Resource Persons involve community in managing water and liaison with local government bodies [3] 6. Increased community awareness [3] 7. Local stakeholders help crowd source data [3]	1. Understand the water resource base [3] 2. Monitoring water resources [3] 3. Protecting water sources [3] 4. Community water management [3] 5. Biodiversity conservation [3] 6. Awareness raising [3] 7. Providing clean water [1,3] 8. Increase community involvement [3] 9. Community capacity building [3] Curtail water borne diseases [1]	1. Water has always been abundant in the region. Due to unhealthy land use practices, pressure from tourists and loss of traditional management practices, water is either depleted or polluted today. If the monsoon fails, water scarcity surfaces and the local government is forced to search for new, alternate sources to meet the high demand [3] 2. Provision of drinking water will help curtail most waterborne diseases [3]	1. NGO being a newcomer in this area, it took some time to develop a rapport with the mostly non-tribal communities; this was further hampered by loss of personnel [3] 2. Challenges in measuring spring discharge owing to the nature of the springs [3] 3. Restoration activity highly dependent on next monsoon season [3]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	15. Water Stewards [3] 16. Regional Water Portal [3] 17. Biosand filter [1]	1. NGO plans interventions based on research 2. Community demands habitat restoration and removal of existing exotic plantations [3] 3. Community identified changes in the forest [3]			
Research					
	1. Biodiversity inventory [2,3] 2. Field visits [2,3] 3. Ecological survey 4. Publication of traditional knowledge field guides [3] 5. Case Studies [2,3] 6. Participatory meetings [3] 7. Harvest Protocol [3] 8. Database [2] 9. Concept notes [2] 10. Translated policies and documents [2] 11. Presentations [2,3] 12. Exploratory studies [2] 13. Impact assessment [2] 14. Questionnaire survey [2] 15. Secondary literature review [2]	1. Constant interaction with communities [3] 2. Contribute to scientific information on the region [3] 3. Community decides baselines [3] 4. Community guidelines for sustainable and hygienic harvest of each NTFP [3] 5. Community awareness [2] 6. Experience sharing with communities and other NGOs [2]	1. Challenging the exclusionary forms of conservation [2] 2. Promote community based conservation [2,3] 3. Understanding and assessing the social and ecological impacts [2,3] 4. Understand implementation of Forest Rights Act in protected areas [2] 5. Identify potential areas of intervention [2,3] 6. Identify potential ecological threats [2,3]	1. For interventions to be successful, there is a need to identify villagers with interest in the objectives NGO wanted to promote and the communities that are cohesive enough to engage with NGO programmes [2]	
Health					
Nutrition and medicine connected to biodiversity	1. Kitchen gardens [3] 2. Health programmes [3] 3. Promoting use of medicinal plants [1,2,3] 4. Uncultivated Vegetable Festival [2] 5. Booklet on Wild vegetables [2]	1. Families grow different vegetable varieties grown [3] 2. Landless families have alternate livelihood options and income [3] 3. Community celebrates their own produce and culture [2,3] 4. Medium to get the community and other stakeholders together [2] 5. Opportunity for women to assess their own abilities to organize events of such a magnitude [2] 6. Opportunity for women to earn some revenue [2]	1. Local food security, sovereignty and nutrition [2,3] 2. Biodiversity conservation [2,3] 3. Ensures cost effective community nutrition and health 4. Increase the community's ability to enhance its own health and development [1,2,3] 5. Increase the community's ability to enhance its own livelihood outcome [2,3] 6. Develop a trust-based relationship with the community [2,3]	1. Kitchen gardens and wild foods provide are an important source of nutrition which increases wellbeing of indigenous communities [2,3] 2. Indigenous communities have their own traditional knowledge and traditional medicines. These medicines don't have any side effects and it is cheaper, it is a local knowledge and locally available. [1]	
Improving health	1. Health fund to support medical emergencies [3] 2. Cooperation with hospitals [3] 3. Community Health Workers [3] 4. Medical support, monitoring and follow up on the care of select individuals [3] 5. Mandatory weekly village visits and interaction [3] 6. Health and awareness classes [3]	1. Community Health Workers understand their significance in the community, assist patients and bridge gap between patients and doctors, interact with other stakeholders, pain and palliative care units, Forest Department officials, tribal health promoters, etc. in relation to health-related issues [3]	1. Empowering community ownership on health and wellbeing [3] 2. Understand the people's perception and knowledge of illnesses, risk factors, Water, Sanitation and Hygiene knowledge and diet diversity [3] 3. Understand the linkages of the people's health to their culture and environment [3]	1. Though income levels have gone up and conservation initiatives are in place, the health and well-being of the indigenous population is deteriorating. Lack of social cohesion, and a sense of loss along with the impact of the rate of change has an adverse effect on their overall wellbeing [3]	1. Certain issues (excessive alcohol and tobacco consumption) within the community need to be urgently addressed. Malnutrition calls for special attention [3] 2. Floating population of the community health workers, which in turn affects the follow up of patients [3] 3. Programme affected by lack of funds and timely medical intervention [3]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	7. Health and social counselling [3] 8. Trainings [3] 9. Exposure visits [3] 10. Community Well Being Cards [3]		4. Community Health Workers in each working are as pillars of social support for the community, for any issue that the villagers may face		
Alternate energy/materials	1. Building ecotourism facilities [3]		1. Provision of cost effective infrastructure [3] 2. Community livelihood [3]		
Climate Change					
Disaster management	1. Social Economic Status (SES) profiles of local communities [3] 2. Ecological calendars [3] 3. Weather stations [3] 4. Dream Sessions [3] 5. Concept notes [3]	1. Local groups and organisations to source existing international climate change adaption funds [3]	1. Deliver established funds for local activities that reduce the intensifying impacts of climate change [3] 2. Discover the impacts and effects of climate change affecting communities whose livelihoods depend directly on the natural environment [3] 3. Promotion of sustainable practices [3] 4. Obtain leverage for advocacy [3]	1. Migration in bees is affected because of erratic rainfall, change in vegetation type (degradation and increase of invasives) and crop shifts from coffee to tea [3] 2. Seed setting in native species becomes unpredictable [3] 3. Increase in human wildlife interaction [3] 4. Understanding the traditional knowledge related to climate will help furnish adaption strategies and carry out appropriate resilience related work to mitigate the local climate	
Climate action	1. Draft for early warning system [3] 2. Liaising with Government [3] 3. Collection of Landslide information [3] 4. Mobile app for data collection [3] 5. Promotion of organic farming [1]	1. Coordinate with government departments [3] 2. Community plants coffee gardens [1] 3. Community cultivates paddy, etc. [1]	1. Creating early warning system [3] 2. Collect Data [3] 3. Improved disaster resilience and humanitarian response by advancing monitoring, assessment, and prediction of natural hazards [3] 4. Re-establish organic farming [1] 5. Contribute to mitigating climate change [1]	1. Disasters like floods and landslides increase, food growing patterns are changing with farmers opting for more hardy cash crops or crops with shorter growing season [3] 2. Drying up of springs and drop in water levels in wells [3] 3. Erratic supply of forest and agriculture produce [3] 4. Traditionally, the indigenous communities practiced organic farming. In recent times, the government has promoted conventional agriculture as part of development schemes, leading to financial and ecological troubles [1]	1. In some areas, there is conflict with elephants. This is true for food crops. Sometimes, indigenous communities accept this, and at others a conversion to cash crops proves beneficial [1,3]
Networking					
	1. Networks with NGOs [2,3] 2. Workshops and meetings at different levels [2,3] 3. Village institution meetings [2] 4. Negotiation with Forest Department [2] 5. Documentation [2] 6. Reports [2] 7. Op-eds and articles in popular media [2]	1. Financially support NGO/ CBO partners for action-research on food biodiversity [3] 2. Collaboration between NGOs [3] 3. Democratic community decision-making on forest conservation and village development [2] 4. Participation of necessary stakeholders [2]	1. Network building [2,3] 2. Provide a platform for sharing information 3. Understand the different motivations and hindrances that villagers faced [2] 4. Create conditions for local, community-owned conservation and management strategies at landscape level [2]	1. Conservation must account for socio-ecological realities of the region and the community in true spirit when decisions regarding conservation and management are made and resources are utilised	1. Forest Rights Act met with hostility 2. Legal cases filed by a few conservation groups against inclusive conservation 3. Strongly emerging narratives against inclusive conservation and rights based approaches to conservation.

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
		5. Co-creating a shared vision for the region with stakeholders [2] 6. Increased community understanding of ecological diversity [2]	5. Address gender inequality, especially in Forest Rights Act processes [2] 6. Attempt to bring together a more progressive group of conservation organisations and individuals [2] 7. Create a counter narrative to promote inclusive conservation [2] 8. Enabling food sovereignty, traditional knowledge and local action amongst marginalised communities [3]	2. Problems typical to protected areas in India such as timber smuggling and illegal hunting are a concern as the area is home to a diverse variety of birds, animal and plant species. 3. There was high pressure to dereserve the sanctuary, especially from political leaders who had vested interests in the region and saw de-reservation as an opportunity to boost infrastructure investment 4.	4. A lack of support from the Forest Department has made it harder for local people to continue with the conservation plans. This has further affected their morale which took years of work to build 5. Court orders to evict those whose Forest Rights Act claims have been rejected 6. Amendment to the Indian Forest Act and guidelines issued by the Central Government
Funding					
Providing funds	1. Yearly Grants for Indian NGOs [3] 2. Opportunity based grants for indigenous communities [3] 3. Monitoring grants [3] 4. Micro, small and large grants [3] 5. Student fellowships [3]	1. Funding to NGOs that focus on capacity building, awareness raising and policy dialogue concerning natural resources, good governance, and constitutional provisions in scheduled/tribal areas and important laws such as the Forest Rights Act and the PESA [3] 2. Increasing female students from local communities [3] 3. Students gain education [3] 4. Work with both national and grassroots groups to bridge the gap between local and international lobby and advocacy [3]	1. Strengthen and unify the women's rights and environmental justice agendas [3] 2. Recognise important role of grassroots initiatives as communities are the key implementers of environment and development agendas [3]	1. Communities face the brunt of adverse changes and are impacted the most by global policies. Striving to make a change is often most palpable in the field and its relevance to the world is striking [3]	
Fund raising	1. Writing funding proposals [3] 2. A small health fund to support medical emergencies [3] 3. Approaching funders for funding [1]				1. It is difficult to find funders as most international funders have changed their focus from India to the African continent

Appendix B2: Type II NGO interventions

			*
Environmental	Economic	Social	Planned activities

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Biodiversity Management					
Nurseries	1. Identify and list native species [5,6] 2. Collecting native species seeds [6] 3. (Decentralised) Native species nursery [5,6] 4. Preparing saplings, seeds [5,6] 5. Vermicompost units [5] 6. Experiments [6] 7. Distribution/provision of planting material [5,6] 8. Workshops [5] 9. Trainings [5] 10. Women's group [5] 11. Community conservation plots [5] 12. Awareness programmes [5]	1. Community skill development for plant identification [5] 2. Community income increase [5] 3. Provide community with planting material [5]	1. Conserve biodiversity and native species [5,6] 2. Restoration of rainforest fragments [6] 3. Monitoring seed germination patterns [6] 4. Diversified the native species mix [6] 5. Ensure availability of stock planting materials and address shortage of seeds of vegetables and tubers [5,6] 6. Proper documentation of native species [5]	1. Attention goes to the most degraded forest fragments which would need immediate attention and restoration [6] 2. NGO cannot plant only what species are available and so, there is a need to identify the native species [6] 3. NGO does not go into forest fragments to collect native species seeds and doesn't interfere with the natural activity within the forest. It collects seeds which are available along the roads and trails which don't have any survival chances [6] 4. There has been a huge decrease in the number of farmers involved in traditional paddy cultivation due to low productivity, attack from wild animals and birds as well as due to the unavailability of purified seeds [5]	1. Cannot get planting material (native species saplings) from the forest fragments for planting but instead must collect and grow seeds from along roads and trails [6] 2. Unpredictable weather patterns pose a threat to the seed village initiative because paddy cultivation was badly affected by floods [5]
Seed conservation	1. Collection of native seeds [6] 2. Treated seeds [5,6] 3. Nursery [6] 4. Seed villages [5] 5. Decentralised seed banks [4] 6. Platform for seed exchange [5] 7. Training [5] 8. Seed distribution [5] 9. Community Conservation Plots [5] 10. Seed festival [5] 11. Seed network [5] 12. Research [5]	1. Farmers conserve and produce native seeds [4,5] 2. Community income increase [5] 3. Community skill development [5] 4. Community awareness [5] 5. Increased local youth participation [5]	1. Conserve biodiversity and native species (rare, endemic and threatened) [5,6] 2. Restoration of rainforest fragments [6] 3. Monitoring seed germination patterns [6] 4. Diversified the native species mix [5,6] 5. Ensure availability of stock planting materials and address shortage of seeds of vegetables and tubers [4,5,6] 6. Conservation of genetic diversity of selected crops [5] 7. Proper documentation of native species [5] 8. Address malnutrition among tribal communities [5] 9. Address poverty among tribal communities [5]		

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Tree planting Ecological restoration	1. Identify and list native species [5] 2. Identify places that require immediate attention [6] 3. Rainforest restoration [6] 4. Planting native species saplings [5,6] 5. Maps [6] 6. Fencing [6] 7. Research [6] 8. Mixed native species planting protocol [6] 9. Workshops [5,6] 10. Women's group [5] 11. Distribution of planting material [5] 12. School gardens 13. Awareness programmes [5] 14. New voters planting trees in memory of casting their first vote [5] 15. Use of folk-art to initiate conservation and interest in sacred groves [5]	1. Community skill development for plant identification [5] 2. Community awareness [5] 3. Community self-confidence increases [5]	1. Conserve biodiversity and native species [5,6] 2. Restoration of rainforest fragments and sacred groves [5,6] 3. Diversified the native species mix [5,6] 4. Sequester carbon 5. Certain species are reappearing in restored fragments [6] 6. Promotion of medicinal and other useful plants [5] 7. Understand native species diversity and extent of loss of the native species [6] 8. Support lots of wildlife naturally [6] 9. Increase canopy cover [6] 10. Increase confidence of local populations [5]	1. Across the globe, people are trying to increase forest cover. Each country has committed to increase forest cover to meet climate change goals. Most often in restoration, thousands of saplings are planted in a short period, most belonging to one or two species. There is no diversity (monoculture). Even though it may increase forest canopy cover, it is not similar to the native species composition which would mimic the natural forest. Thus there is a need for research based eco-restoration [6] 2. Sacred groves are the remnants of the past vegetation. They have degraded over a period of time. The sacred grove is a cultural reserve where tribal populations worship their ancestral spirits and attribute those spirits on trees and other wild biodiversity. The NGO respects such traditional knowledge and practices. Such respect helps tribal population gain the confidence to conserve such areas [5]	
Invasive species management	1. Weed removal [6] 2. Planting around edges of forest fragments [6] 3. Monitor lantana removal [4] 4. Long term research [4] 5. Survey [4] 6. Exposure visit [4]	1. Scientific data on the benefits of lantana removal [4]	1. Prevent the spread of invasives [6] 2. Assessing significance of biological invasion for cultural conservation [4] 3. Document the impacts of Lantana on peoples' continued cultural use of the landscape [4]	1. Lantana camara L. is one of the world's worst invasive plant species, posing a serious threat to native biodiversity, wildlife, and ecosystem services. Hence, control of Lantana spread is an important management challenge and a high priority for forest managers and farmers [4] 2. There is a lot of weed invasion in forest fragments. Weed invasion happens from the edge to the interior. Rainforest fragments have tall trees but the loss or opening of the canopy will lead to weed proliferation. Species like Lantana camara, Crommolina spp., and Reddalia dominate the entire fragment and suppress the native vegetation growth [6]	
Agroforestry	1. Trainings [4] 2. Meetings between experts and stakeholders [4,5] 3. Agroforestry promotion [4,5] 4. Technical support [5] 5. Nursery [5]	1. Community income increase [4,5] 2. Community capacity building [4,5] 3. Community cultivates cash crops/shade cultivation [4,5]	1. Biodiversity conservation [5] 2. Carbon sequestration [5] 3. Carbon neutral district [5] 4. Reduce greenhouse gas emissions [4] 5. Forest friendly, climate smart agriculture [4]	1. Smallholder family farms are extremely vulnerable and so there is a need to promote sustainable agriculture [5]	1. Agroforestry has a low yield but higher biodiversity, and there must be a balance between the two [5]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	6. Providing planting material [5] 7. Premium price for shade coffee and other crops [5] 8. Producing worm composts and green manure [4] 9. Monitoring [4]	4. Community uses new agricultural products and techniques [4]	6. Increase in the crop yield [4] 7. Interest generation for the community [5] 8. Promoting community initiatives [4] 9. Decrease in human wildlife conflict [4] 10. Understand long term forest health [4]		
Management Plans	1. Biodiversity management plan [5] Resource Management plans [4] 2. Declaration of biodiversity heritage sites [5] 3. Trainings [5] 4. Participatory natural resource mapping [5]	1. Gram Panchayats sensitisation towards biodiversity conservation [5] 2. Community capacity building [5]	1. Facilitate and motivate gram panchayats [5] 2. Empowering Panchayati Raj Institutions [5] 3. Integrating Biodiversity conservation into local level planning [5]		
Conservation agreements	1. Trainings [6] 2. Consultations [6] 3. Conservation commitments [6] 4. Equipment and apps for forest department [6] 5. Translation of laws [6]	1. Community capacity building [6] 2. Shift of community (especially women) from fuel wood to LPG [6]	1. Direct community interventions [6] 2. Increased health of women [6] 3. Reduction of human-animal conflict [6]		
Working on coffee estates	1. MoUs with coffee and tea estate companies [6] 2. Native tree plantations in coffee estates [6]	1. Tea and coffee plantations use native species to as shade trees [6]	1. Encourage corporates to have native species in their tea and coffee plantations [6] 2. Protect and improve rain-forest fragments present within tea and coffee plantations [6] 3. Bridging corporate and nature activities [6]	1. Historical exploitation for tea and coffee led to fragmentation of prime forest areas. These plantations are now owned by national and multinational companies who are the main stakeholders. Working with them makes it is easy to protect these rain-forest fragments and their wildlife [6] 2. Coffee companies are interested in native trees that provide more shade because coffee requires shade. Tea requires less shade than coffee and usually has exotic species like silver oak placed at regular distances. Silver oaks are hosts for pests (red mites) and huge amounts of money are spent on pest management. Replacing silver oaks with native species reduces pest occurrence without compromising profits or requiring tea areas to be converted to natural areas [6]	1. It is important to balance company targets against conservation goals [6]
Managing human wildlife conflict	1. Bulk SMS system about elephant locations [6] 2. Updates on local television channels [6] 3. Announcements in public transport [6] 4. Digital display board [6] 5. Gathering people's mobile numbers (voluntary and consensual) [6]	1. Early warning systems for covering estate workers, women self-help groups, merchants, daily wage workers, managerial staff, and Forest Department personnel [6] 2. Community participation to facilitate commuters about elephant locations in public transport [6]	1. Reduce human-animal conflict and promote coexistence [4,5,6] 2. Lower loss of life [5,6] 3. Lower crop damage [5,6] 4. Lower levels of community anxiety and stress [6] 5. Creation of model landscapes [6] 6. Wider information dissemination [6]	1. Tea plantations are not damaged by elephants but are primarily used for moving from one forest fragment to the other. Tens of thousands of people are dependent on tea and coffee plantations. It is immoral and unethical to evict people from the landscape they have been living in for 100-120 years [6]	1. If conflict is reduced and no death occurs, people become complicit. Individual negligence may lead to fatality. Constant awareness raising is necessary. Difficult to address how some individuals feel that they know landscape as they were raised there [6]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	6. Voice calls with recordings of elephant locations [6] 7. Mobile operated alert lights in critical locations [6] 8. Create an elephant information network [6] 9. Emergency contact number [6] 10. Liaising with government [5,6] 11. Development of optical fences [6] 12. Selection of farms [6] 13. Provide funding to farmer groups to set up solar powered fences [6] 14. Providing solar-powered lights [6] 15. Awareness raising [5,6] 16. Manual in local language on managing conflict [6] 17. Promoting agroforestry and cash crop cultivation [4,5]	3. Increased accessibility of information for community [6] 4. Local community members responsible for turning on alert lights [6] 5. Forest Department provides Rapid Response teams and helpline for conflict situation [6] 6. Community members happy about helping their community [6] 7. Increased sharing of information from community members [6] 8. Community fear of elephants decreases [6] 9. Communities can continue completing their chores after sunset [6] 10. Children can now study even at night [6] 11. Community farm fencing [6] 12. Farmers cultivate cash crops [4,5] 13. Community awareness [5,6]	7. Provide an economically viable wildlife conflict management options [5,6] 8. Include people in the conflict management [6]	2. Communities settled near protected areas face high instances of human wildlife conflict on multiple levels. Many families live on the periphery of protected areas in isolated houses that have no electricity. Wild animals often raid their haystacks and destroy their property. Human deaths instilled a sense of fear and anger amongst local communities towards elephants, often resulting in retaliatory action against the animals [6] 3. Human elephant conflict with loss of life is mostly accidental and happens when people are not aware of elephant presence. There is a need for an early warning system that can reach thousands of people in a fraction of a minute [6] 4. Even if one person dies due to conflict, the whole family suffers. He/She maybe a bread winner. And entire village develops negative attitude towards elephants. They want to treat elephants as killers and pressure state forest department to take reactive measures against the elephant. People immediately ask for the removal of the elephants. Therefore, addressing the human death and the fear of elephant is the most critical thing in the landscape [6] 5. Working with people and government departments can reduce wildlife conflict and positive results can influence other regions with similar conflict situations. Early warning systems were implemented in two areas, representing two different kinds of land use patterns common along the Western Ghats. As a small organization, NGO cannot work in everywhere and upscaling across multiple landscapes is difficult [6]	2. Unplanned chasing of elephants, ignoring warnings, and inebriation resulted in human fatalities [6] 3. Reducing crop damage is another challenge as it requires many different stakeholders to be involved [6] 4. It is difficult to drive away elephants once they enter a paddy farm because the food is close by [6] 5. Capture of two elephants by the state Forest Department due to pressure from local people [6] 6. Difficult to convince people not to pressure the government into taking extreme steps to remove the elephants [6] 7. Calls undelivered due to network congestion, no response to calls, and cancellation of calls [6] 8. Due to technical faults and logistical difficulties in bus timings along designated routes, announcements in public transport was stopped [6]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
				6. Paddy is usually grown on subsistence farms. The harvest determines whether a person can feed their family and their quality of life for the rest of the year. Elephants damage paddy, leading to negative interactions. Providing affordable technology that alerts a person before an elephant enters the farm can reduce such conflict. The farmers can guard their fields while elephants are wary of human presence. People don't have to drive elephants away (an activity that endangers people's lives) [6]	
Wildlife Conservation	1. Liaising with the government officials [6] 2. Equipment and support for government officials [6] 3. Document poaching cases [6] 4. Trainings [6] 5. Workshops [6] 6. Consultations [6] 7. Conservation agreements [6] 8. Translation of laws [6] 9. Research [6] 10. MSc thesis [6] 11. Publications [6] 12. Camera trapping [6] 13. Nest monitoring [6] 14. Watch programme [6] 15. Mapping [6] 16. Vulnerability surveys and questionnaires [6] 17. Establish and repair canopy bridges [6] 18. Monkey-proofing of vulnerable households [6] 19. Awareness programmes [6] 20. Talks and presentations [6] 21. Educational posters [6] 22. Solar water pump [6]	1. Community capacity building [6] 2. Shift of community from fuel wood to LPG (mostly women benefited) [6] 3. Contribute to scientific understanding of wildlife [6] 4. Awareness raising to reduce the speed of driving on mountain roads [6] 5. Awareness raising, particularly for tourists [6] 6. Convince communities and government officials to accept wildlife in their vicinity [6] 7. Convincing government departments against road expansion and other activities that negatively affect the environment [6] 8. Improving garbage disposal [6]	1. Protect rain-forest fragments from road expansion [6] 2. Reduce human-animal conflict and promote coexistence [6] 3. Understand the nature of human – animals interactions [6] 4. Documenting animal populations [6] 5. Document people's attitudes and perceptions of wildlife [6] 6. Use results to strategize possible interventions [6] 7. Improve women's health [6]	1. Western Ghats supports an incredible endemic diversity of animals most of which are not found anywhere else in the world, including mammals and amphibians [6] 2. Biodiversity is destroyed by road expansion. There is a need to convince the Highway and other departments of the value of endemic biodiversity and the advantages of having slower vehicular traffic on mountain roads [6] 3. In recent years, macaque troops have become habituated to people and come into conflict more often. This has been triggered due to feeding of monkeys by tourists and improper garbage disposal. The arboreal primate now spends a significant time on the ground is injured or killed because of vehicular collision [6] 4. Livestock killing is one of major causes of human-leopard conflict. Leopards killed or put down in retaliation (lynched, poisoned, shot) due to conflict incidences or on request from communities [6]	1. Unable to convince the Highways department that biodiversity is important [6]
Corridor conservation	1. Short term study [6] 2. Large driver awareness sign boards [6] 3. Driver awareness outreach [6] 4. Installed road humps in hotspots [6] 5. Surveys of vehicular traffic [6] 6. Restoration of forest fragments [6] 7. Planting native species [6] 8. Liaising with government officials [6] 9. Corridor Conservation Committee [4]	1. Awareness raising to reduce the speed of driving on mountain roads [6]	1. Understand the utility of corridor by large mammals [6] 2. Protect and improve the quality of the forest fragments [6] 3. Support wildlife naturally [6] 4. Protect important wildlife corridors [4,6]	1. Protecting rainforest fragments allows easier migration of biodiversity [6]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Monitoring	1. Monitoring protocols [4] 2. Monitoring NTFPs [4] 3. Long-term ecological monitoring plots [4,6] 4. Bird surveys [6] 5. Phenology trails [6] 6. Monthly monitoring of marked trees [6] 7. Tree surveys [4,6] 8. Monitoring species composition [6] 9. Monitor forest carbon [6] 10. Annual censuses [6] 11. Documentation [6] 12. Database of elephants [6]	1. Contribute to scientific data on wildlife in the region [4,5] 2. Provide community data on production, extraction, regeneration and factors affecting NTFPs [4]	1. Understand and strategize suitable pro-active conflict mitigation measures involving local communities and the state Forest Department [6] 2. Address sustainable harvesting related issues [4] 3. Understand key ecological trends [4,6] 4. Understand how climate change affects the landscape [4,6] 5. Understand spread of invasive species [6]	1. Sustainable management of natural resources is a product of complex interactions between ecological, cultural, economic, and political components. Understanding the ecology of any species hence is critical for conserving and comprehending its sustainability for future use [4]	1. There is little or no baseline data available
Community monitors/Stewards	1. Training [4] 2. Value-addition committee meetings [4] 3. Scientific data on fruit production, extraction and regeneration [4] 4. Scientific and genetic monitoring data [4] 5. Participatory resource monitoring [4] 6. Site-based adaptive management [4] 7. Harvest protocols [4] 8. Manuals [4] 9. Seasonal availability calendar [4] 10. Importance value index [4] 11. NTFPs Handbook Trainings [4] 12. Provide SIM cards and technology to operate early warning systems [6] 13. Identify operators in each area [6] 14. Information hotline [6] 15. Gather information on how this system functions [6]	1. Community capacity building [4] 2. Improved community harvesting techniques [4] 3. Generates interdisciplinary knowledge [4] 4. Early warning systems for covering estate workers, women self-help groups, merchants, daily wage workers, managerial staff, and Forest Department personnel [6] 5. Community participation to facilitate commuters about elephant locations in public transport [6] 6. Local community members responsible for turning on alert lights [6] 7. Community members happy about helping their community [6] 8. Increased sharing of information from community members [6] 9. Community fear of elephants decreases [6] 10. Community awareness [6]	1. Building community capacity to allow them to monitor resources themselves [4] 2. Document the status of the resource, extraction and impact of harvest [4] 3. Develop improved and sustainable harvesting protocols for NTFPs [4] 4. Lower property damage [6] 5. Lower human deaths [6] 6. Creation of model landscapes [6] 7. Create a multilayer network system [6] 8. Reduces wildlife conflict and promotes safer co-existence [6]	1. Communities are interested in monitoring production and extraction of the resources. By estimating production levels, the community is able to estimate their business and income for a particular year, plan accordingly and adapt to the situation [4]	1. It is hard to interest communities in activities that will only benefit them in the long term as they are more concerned with day to day survival.
General	1. Anti-plastic campaign [4]		1. Ban of plastic use [4] 2. Initiation of other environmentally friendly programmes [4]		
Alternate Livelihoods					
Apiculture	1. Sustainable honey harvesting programme [4] 2. Training [4,5] 3. Exposure visits [5] 4. Production units [5] 5. Awareness programmes [4] 6. Outreach materials [4] 7. Research [4] 8. Equipment and technical support [5] 9. Exhibitions [5]	1. Community capacity building [4,5] 2. Community sustainably harvests NTFPs [4] 3. Community reduces NTFP extraction [4] 4. Community income [4,5] 5. Income as incentivises community to save forest [4] 6. Contribution to scientific data on honeybees [4]	1. Biodiversity conservation [4] 2. Promotion of Beekeeping [5] 3. Community livelihood [4,5] 4. Interest generation for the community [5]	1. People are highly dependent on NTFPs and they harvest quite a bit. Honey is an important NTFP the community is dependent on [4] 2. Honeybees play an important role in the ecology of tropical forests, besides supporting the livelihood indigenous communities [4]	1. Not everyone within this community follows sustainable harvest protocols [4]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Agriculture	1. Promoting agroforestry and cash crop cultivation [4,5] 2. Domestication of wild crops [5] 3. Trainings [4,5] 4. Exposure visit [5] 5. Community Training Centre [5] 6. Premium price for shade coffee and other crops [5] 7. Farmer's Producer Company [4,5] 8. Meetings [4] 9. Producing worm composts and green manure [4,5] 10. Distribution of seeds, manure and equipment [5] 11. Vaccination of livestock [5] 12. Community Conservation plots [5] 13. Lectures [5]	1. Community capacity building [4,5] 2. Community awareness [5] 3. Use of new agricultural products and techniques, especially by indigenous youth [4,5] 4. Farmers cultivate cash crops [4,5] 5. Farmers produce seeds of native varieties [5] 6. Farmers increase crop production [5] 7. Community income [4,5]	1. Biodiversity conservation [5] 2. Carbon sequestration [5] Reduce greenhouse gas emissions [4] 3. Forest friendly, climate smart agriculture [4] 4. Improve community's natural resource management practices like soil management, watershed management and their agricultural production [4,5] 5. Community livelihood [5] 6. Interest generation for the community [5] 7. Retain tribal youths in agriculture [5] 8. Promoting community initiatives [4] 9. Community health [5] 10. Reduce human wildlife conflict by mitigating chronic crop-raiding [4]	1. Smallholder family farms are extremely vulnerable and so there is a need to promote sustainable agriculture [5] 2. With modern development, communities are caught between their traditional ways and ill aspects modern ways of living, especially youth. It is necessary to promote their interest in traditional ways of life, and attract and retain them in agriculture for the benefit of both community and environment [5]	1. Agroforestry has a low yield but higher biodiversity, and there must be a balance between the two [5]
NTFP collection and value addition	1. Sustainable harvest programme [4] 2. Training [4,5] 3. Exposure visits [5] 4. Decentralised processing units [4,5] 5. Equipment and technical support provided [5] 6. Organic certification [4] 7. Joint liability groups [5] 8. Farmer's Producer Company [4,5] 9. Research [4] 10. Learning forums [4,5] 11. Awareness programme [4,5] 12. Outreach materials [4] 13. Exhibitions [5] 14. Surveys [5]	1. Community capacity building [4,5] 2. Community sustainably harvests NTFPs [4,5] 3. Community reduces NTFP extraction [4] 4. Community hygienically value adds, packs and stores NTFPs [4,5] 5. Community income (especially for women) [4,5] 6. Income as incentivises community to save forest [4] 7. Contribution to scientific data [4] 8. Community awareness [4,5] 9. Community leadership [5] 10. Community group formation [5] 11. Community has improved livestock and crop management [5]	1. Biodiversity conservation [4] 2. Reducing community dependency on fuel wood [4] 3. Enable sustainable harvesting of forest resources [4,5] 4. Community livelihood [4,5] 5. Improved NTFP processing and quality [4,5] 6. Interest generation for the community [5] 7. Community health [4,5] 8. Community leadership [5] 9. Women's empowerment [5]	1. People are highly dependent on NTFPs and they harvest quite a bit. Tribal households solely depend on NTFPs as their major source of family income [4,5] 2. By increasing the community's stake in the conservation as the income generated will incentivise them to conserve and monitor the resources [4]	1. Not everyone within this community follows sustainable harvest protocols [4] 2. Local tribal populations are mostly foraging or subsistence communities and don't have a culture of making anything for the market [5]
Marketing	1. Decentralised NTFP processing units [4,5] 2. Procuring and selling of products [5] 3. Trainings [5] 4. Technical support [5] 5. Farmer Producer Company [4,5] 6. Multilevel Marketing organisation [4] 7. Cooperative society [4] 8. Sales outlets [4] 9. Weekly markets [5] 10. Marketing of NTFPs [5]	1. Community markets forest products locally and in other parts of the state 2. Community hygienically value adds, packs and stores NTFPs [4,5] 3. Community income (especially for women) [4,5] 4. Community develops sustainable resource management strategies with NGO 5. Community capacity building [5] 6. Community leadership [5] 7. Families come together to produce for the market [5]	1. Community livelihood [4,5] 2. Improved NTFP processing and quality [4,5] 3. Community leadership [5] 4. Women's empowerment [5]		1. Local tribal populations are mostly foraging or subsistence communities and don't have a culture of making anything for the market [5]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Farmer Producer Organisation	1. Promoting agroforestry and cash crop cultivation [4] 2. Trainings [4,5] 3. Meetings [4] 4. Producing worm composts and green manure [4,5] 5. Technical support [5] 6. Farmer Producer Company [4,5] 7. Procuring and selling of products [5] 8. Weekly markets [5] 9. Marketing of NTFPs [5] 10. Festivals [5] 11. Exhibitions [5]	1. Community capacity building [4,5] 2. Community awareness [5] 3. Use of new agricultural products and techniques, especially by indigenous youth [4,5] 4. Farmers cultivate cash crops [4,5] 5. Farmers produce seeds of native varieties [5] 6. Farmers increase crop production [5] 7. Community income [4,5]	1. Biodiversity conservation [5] 2. Carbon sequestration [5] Reduce greenhouse gas emissions [4] 3. Forest friendly, climate smart agriculture [4] 4. Improve community's natural resource management practices like soil management, watershed management and their agricultural production [4,5] 5. Community livelihood [4,5] 6. Promoting community initiatives [4] 7. Community leadership [5] 8. Reduce human wildlife conflict by mitigating chronic crop-raiding [4]		1. Local tribal populations are mostly foraging or subsistence communities and don't have a culture of making anything for the market [5]
Ecotourism	1. Selected communities to implement ecotourism activities [5]	1. Community income [5]	1. Community livelihood [5]		
Lantana furniture	1. Lantana Craft Centres (LCC) [4] 2. Trainings [4] 3. ID cards and insurance coverage [4] 4. Exemption of commercial tax [4] 5. Product development [4] 6. Market linkages [4]	2. Community income [4] 3. Community capacity building [4]	2. Community livelihood [4] 3. Promotion of tribal artisans [4] 4. Decreasing density of invasives and increasing density of native species [4]	1. *Lantana camara L.* is one of the world's worst invasive plant species, posing a serious threat to native biodiversity, wildlife, and ecosystem services. Hence, control of Lantana spread is an important management challenge and a high priority for forest managers and farmers [4]	
Other skills	1. Trainings [4,5] 2. Teaching forums [4] 3. Classes on livelihood sources [4] 4. Equipment provision [5] 5. Production units [5]	1. Communities can explore other income sources [4,5] 2. Communities can set up village enterprises [4]	1. Community livelihood [4,5]	1. Ensuring forest-dwelling communities have financial security [4] 2. Teach resident communities to conserve and protect their environment [4]	
Tenure Interventions					
Filing claims	1. Workshops [4] 2. Exposure visits [4] 3. Community initiatives [4] 4. Interact with village institutions [4] 5. Forest Knowledge Centre [5*]	1. Community awareness [4,5*] 2. Recognition, confirmation and claiming of individual and community forest rights claims by the government [4] 3. Improve self-respect of tribal community [4] 4. Community effort to conserve resources, monitor and sustainably use forest [4]	1. Ensure community and individual tenure, monitoring and management rights over forest resource [4] 2. Prevent forced relocation and allow communities an opportunity to remain within the forest [4] 3. Ensure community livelihood [4] 4. Reconciling community rights and livelihood needs with conservation goals in protected areas [4]	1. Communities in the region have historically depended on forests for their livelihoods and sustenance. There is a need to balance their livelihoods against conservation goals [4] 2. Earlier, communities lived in fear of being evicted. Under the Forest Rights Act, they have an opportunity to stay in the forest and manage and conserve their forest resources [4, 5*] 3. Interacting with villagers reaches wider audience and is more sustainable approach [4]	1. The project did not go through due to a lack of funding meant that [5*]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Mapping	1. Scientific resource maps [4, 5] 2. Community resource maps [4]	1. Community use of traditional knowledge to produce resource maps [4]	1. Use of scientific monitoring protocols to monitor forests [4] 2. Encourage community to monitor resources using traditional knowledge [4]		
Others	1. Policy interventions [4] 2. Reports [4] 3. Community Forest Management Plans [4]	1. Community creates forest management plans [4] 2. Community awareness [4] 3. Scientific data generated by NGO [4]	1. Addressing roadblocks that hinder FRA implementation [4] 2. Implementing FRA [4] 3. Safeguard traditional livelihoods [4]		
Capacity Building					
Strengthening village institutions	1. Capacity building trainings [5,6] 2. Workshops [5] 3. Participatory natural resource mapping [5] 4. Community-level agrobiodiversity registers [5] 5. Biodiversity management plan [5] 6. Formal and informal interactions with village institutions [4,5,6] 7. Technical support in processes and steps in organizing annual general body meetings [5] 8. Accounting [5] 9. Gram Sabha meetings [5,6] 10. Tribal Development Council [5] 11. Village Planning Committee [5] 12. Purchase Committee [5] 13. Family group meetings [5] 14. Microenterprise development [5] 15. Distribution of seedlings and agritools [5] 16. Festivals [5] 17. Seminars [5] 18. Market fairs [5] 19. Community Agro-biodiversity Awards [5]	1. Gram Sabha exercises community rights over forest resource [4] 2. Help community constitute forest institutions [4] 3. Community capacity building [4,5] 4. Community awareness [5,6] 5. Community self-confidence increases [4,5] 6. Increased participation, especially of women [6] 7. Sharing information between community and NGO [6] 8. Village governments plan and integrate biodiversity conservation into village level planning [5] 9. Involvement of local communities in the planning and decision-making process in addressing issues with human-elephant conflict [6] 10. Encourage village governments to provide facilities that will reduce human animal conflict [6] 11. Community income [5]	1. Declaration of biodiversity heritage sites [5] 2. Encourage community to conserve forest [4] 3. Recognise families who are conserving agrobiodiversity [5] 4. Facilitate and motivate gram panchayats [5,6] 5. Building social structures for sustainable and collective management of natural resources [5] 6. Systemic change in the way communities consider wildlife conflict [6] 7. Community livelihood [5]	1. Interacting with villagers reaches wider audience and is more sustainable [4] 2. Panchayat and village institutions play an important role in providing facilities to ease human-animal conflict [6]	1. While people sometimes cooperate, other times they do not show up. They cannot be forced to attend the meetings and it is difficult to interact with them [6]
Gender Equality	1. Women's groups [5] 2. Working with Self Help Groups [5] 3. Capacity development programme [5,6] 4. Scoping study and research [5] 5. Research, restoration, and training centre [6] 6. Employing government schemes [4] 7. Documenting traditional knowledge [4]	1. Capacity building of women [4,5] 2. Community self-confidence increases [4,5] 3. Increased participation, especially of women in the planning and decision-making process in addressing issues with human-elephant conflict [6] 4. Create awareness on, strengthen, and expand information network [6] 5. Shift of community from fuel wood to LPG (mostly women benefited) [6]	1. Capacity development of women [5] 2. Community health [6] 3. Explore the ways in which women's use of modern energy (broadly, electricity, LPG and diesel) is related to their empowerment [5] 4. Improving equitable energy access by influencing policies [5] 5. Reduction in human-wildlife conflict [6]	1. The use of alternative energy sources may lead to empowerment of women, or empowerment of women may lead to a change in the use of energy. For example, this could include a shift from household-polluting solid biomass to nonhousehold- polluting LPG or use of machinery in agriculture operations [5]	1. NTFP collections are made by the men and they are the ones in the forest and spend more time in collecting these resources and marketing them. Therefore, most of the NGO's interventions have been targeted in that direction [4]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Others	1. Trainings [4,5,6] 2. Youth skill development trainings [5] 3. Volunteer selection [5] 4. Facilitating community interactions with experts [4] 5. Formal and informal meetings with gram panchayats, religious leaders, and political leaders [6] 6. Research, restoration, and training centre [6] 7. Biodiversity Conservation Corps [5] 8. Primary village level youth clubs [5] 9. Innovation cell [5] 10. Directory of traditional healers [5] 11. Exhibitions [5] 12. Outreach materials [6] 13. Publications in local languages - handbook on importance of landscape to communities, bird pocket guide (distribute free of cost) [6] 14. Whatsapp group [5]	1. Sharing information between community and NGO [4] 2. Community capacity building [4,6] 3. Capacity building of youths [5] 4. Increased community participation [6] 5. Community awareness [6] 6. Children exposed to ICT [5] 7. Community inputs on conservation [6] 8. Involvement of local communities in the planning and decision-making process in addressing issues with human-elephant conflict [6] 9. Community climate volunteers [5] 10. Assist the community in managing issues related to climate change and crop management [5]	**1. Providing hamlet-level education support to children on how they can easily be trapped into ill aspects of the modern life [5]** **2. Give children the virtue of the modern development without losing their traditional practices [5]** **3. Decreasing the high rate of school dropouts [5]** **4. Document and promote rural innovations [5]** **5. Promoting rural innovations in the area of agriculture and rural development [5]** **6.**	1. There is a high school-dropout rate in the initial years of schooling Children are the future generation. The ICT has penetrated even the tribal locations. So people have now a phone, a smartphone with them. Giving children the ability to study will protect the community from ill aspects of modern development [5]	
Awareness Building					
Awareness building	1. Exhibitions [4] 2. Tribal Development Committee [5] 3. Training [5,6] 4. Workshops [5,6] 5. GIS and Wildlife field technique, natural history, ecological research and monitoring trainings for university students [6] 6. Awareness camps [5] 7. Food festivals [5] 8. Media workshops [5,6] 9. Field visits [5,6] 10. Native language awareness materials [5,6] 11. Formal and informal meetings with gram panchayats, religious leaders, and political leaders [6] 12. Presentations, talks and symposia [6] 13. Orientation tour [6] 14. Documentary and short films [6] 15. Registration days and sensitization programmes [6] 16. Demo of technology [6] 17. Nature camps [6] 18. Street plays [6] 19. Host a number of in-house and collaborative research projects [6]	1. Community displays and sells NTFP products [4] 2. General public awareness [4,6] 3. Community awareness [5,6] 4. Community leadership [5] 5. Community capacity building [5,6] 6. Community inputs on conservation [6] 7. Local pastors deliver messages against wildlife poaching during Sunday and Christmas prayers [6] 8. Sharing information between NGO and community [6]	1. Outreach to general public about biodiversity-related issues [4,5] 2. Biodiversity conservation [5] 3. Convey the importance of wildlife and impress that they are also part of landscape [6] 4. Enhance food system awareness among stakeholders and general public [5] 5. Enhance awareness on precautions that people should be take against wildlife [6] 6. Enhance access to diverse foods in emergencies [5] 7. Utilise opportunity to reach communities through faith [6] 8. Proactively reached out to communities [6] 9. Develop relationships with communities to implement community-based conservation activities [6] 10. Develop community support for conservation [6]	1. For purely agricultural tribes, farmer's rights are very important and the tribal agriculture is very dependent on the forest ecosystem. Their water management, soil management, soil fertility management is largely due to the forest health [5] 2. The loss of lives due to ignored warning and chasing of elephants necessitates carefully designed outreach and sensitization programmes for people. If conflict is reduced and no death occurs, people become complicit. A little bit of negligence on part of an individual may lead to fatality. Therefore constant awareness raising is necessary [6] 3. Conflict is an issue of perception and mitigation requires lots of effort and assurances and evidences of reducing conflict. [6]	1. This training programme cannot be given at the community level [5]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Conservation education	1. Workshops [4, 6] 2. Training [5] 3. Educational camps [5] 4. Workbooks [4] 5. Teachers' manual [4] 6. Classes for children [5,6] 7. School project work, making of working models [5] 8. Lectures and debates [5,6] 9. Field visits [5,6] 10. Nature art and craft sessions [6] 11. Interactive activities: games, quizzes, field observation, origami [6] 12. Essay competitions, Project competitions, etc. [5] 13. Science popularization programme [5] 14. Provision of library books [5] 15. Learning centre [4,5,6] 16. Hosting study abroad programmes [4] 17. Panel discussion [4] 18. Community knowledge representation [4] 19. Weather portal [5] 20. Infrastructure provision [5] 21. Audio and print media [5, 6] 22. Planting fruit trees, etc. in school gardens [5, 6] 23. Displays - paintings, illustrations, posters [6]	1. Training teachers to communicate about biodiversity and conservation through discussions and hands-on activities [4] 2. Interactions between communities and students [4] 3. Community volunteers [5] 4. Teachers and students collect and analyse weather data to discuss local changes in climate [5] 5. Sharing of weather data with other stakeholders [5] 6. Community awareness [5] 7. Create awareness among children on current climate change scenario in the local context [5] 8. Engage children in finding solutions to the environmental problems [5] 9. School children disseminate knowledge among peers [5] 10. Holistic development, including extracurricular activities, of tribal children and youth [5] 11. Students maintain their nature journals and produce arts and crafts such as models of birds [5,6]	1. Disseminated knowledge on lantana crafts, wild medicine, wild food plants, and rainwater management [4] 2. Disseminate project learnings to a wide range of stakeholders and foster discussions leading to scaling up of strategies [4] 3. Inspire children to choose a science-led career [5,6] 4. Educate students on biodiversity and climate change [5,6] 5. Facilitating a learning environment [4,5,6] 6. Achieving "zero school drop-out" rates [5] 7. Empowering tribal and rural families in conservation with sustainable use of biodiversity [5] 8. Discuss alternatives to forest resources and conservation initiatives [6] 9. Work with multiple stakeholders to promote the concept of sustainable development through knowledge, skill and technology transfer [5]		1. Halted due to COVID lockdown [6]
Citizen Science	1. Citizen monitoring of invasive species using smartphones [4] 2. Pilot participatory atlas of invasive species [4] 3. Classes for children [5] 4. Weather portal [5] 5. Birding website [6] 6. Citizen science programme [6]	1. Enable to forest managers and researchers to prioritise species and habitats in need of critical management as well as predict invasions [4] 2. Teachers and students collect and analyse weather data to discuss local changes in climate [5] 3. Children understand local level impacts of climate change [5] 4. Sharing of weather data with other stakeholders [5] 5. Crowdsourcing of scientific data from students, children and ordinary citizens [6] 6. Increase people's access to scientific information [6]	1. Modelling interventions [4] 2. School climate education programme and monitoring systems [5] 3. Generation of scientific data [6]	1. It is necessary to reach out to people beyond the region and encourage them to undertake conservation including students, children and ordinary citizens [6]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Advocacy					
Policy comments	1. Community Conservation Centres [4] 2. Providing policy level interventions [4]	1. Prompting government to change policy based on success of intervention [4]	1. Changes in policy at different levels [4]		
Liaising with Government Departments	1. Implement government schemes [5] 2. Select community representatives for participatory planning and implementation [5] 3. Microenterprise development [5] 4. Providing equipment and trainings [6] 5. Manuals on animal conflict [6] 6. Provide technical support [6] 7. Mediating between community and forest department [4,6]	1. Involvement of local communities in the planning and decision-making process in addressing issues with human-elephant conflict [5,6] 2. Forest Department created rapid response teams [6] 3. Information sharing between NGO and government officials [6] 4. Helps government officials make decisions on where to position teams [6] 5. Presence of uniformed officials helps people feel safe [6]	1. Identify ecologically critical areas [6] 2. Designating some of the existing Reserve Forests as Protected Areas [6] 3. Additional legal protection for several wildlife [6] 4. Protects elephants from being chased away [6] 5. Community safety [6] 6. Community livelihood [5]		
Communication					
Traditional Knowledge	1. Research and scientific studies - PhDs, etc. [4] 2. Document traditional knowledge [4] 3. Website on the tribal life and culture [5]	1. Share knowledge between NGO and community [4] 2. Community capacity building [4] 3. Virtual space for tribal communities to showcase their rich traditions to the outside world managed by tribal youth [5]	1. Understand community's existing knowledge [4] 2. Understand the community's relationship with forest resources and different methods employed for extraction of resources [4] 3. Dynamic virtual space for discussing tribal developmental issues [5]	1. The community uses traditional knowledge for both forest conservation and extraction of forest resources. The community monitors resources and the landscape in the same manner as their ancestors. Thus, it is important to understand their relationship to the resource [4] 2. Communities have knowledge based on their experiences and the number of years they've spent in the landscape. Sharing the same knowledge they already have makes it 'boring' for them. However, communities need this scientific knowledge on current status of NTFPs and future harvests for their livelihood. There is a need to provide scientific knowledge so that it is adds to existing knowledge. Scientific information often has an immediate effect on what they are doing [4]	
Trust building	1. Formal and informal meetings with gram panchayats, religious leaders, and political leaders [6] 2. Trainings [6] 3. Outreach materials [6] 4. Nature camps [6] 5. Street plays [6] 6. Free local language publications handbook on cultural landscape, bird pocket guide [6]	1. Community awareness [6] 2. Community capacity building [6] 3. Community inputs on conservation [6] 4. Local pastors deliver messages against wildlife poaching during Sunday and Christmas prayers [6]	1. Proactively reached out to communities [6] 2. Develop relationships with communities to enable community-based conservation activities.[6] 3. Develop community support for conservation [6] 4. Utilise opportunity to reach communities through faith [6]		

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Watershed Management					
	1. Sapling plantation [5] 2. Sustainable Watershed Development Plan [5] 3. Village Watershed Committees (support) [5] 4. Project Monitoring and Implementation Committee [5] 5. Water sources renovation and construction [5] 6. Field visits [5] 7. Study on traditional methods of water harvesting [5] 8. Monitoring and auditing of watershed activities [5]	1. Enhanced the water availability and water use efficiency in villages 2. Promote technology used by community to harvest drinking water 3. Increased community income from better crop production	1. Address water shortage in summer 2. Improving vegetative cover to strengthen the banks and minimize soil erosion and landslips 3. Reduce the climate change impact by enhancing the vegetative cover 4. Promote investments in the improvement, stabilization and conservation of natural resources 5. Community livelihood		
Research					
	1. Community Conservation and Information Centres [4,5] 2. Field bases for doctoral research [4] 3. Space for monitoring socio-ecological systems [4] 4. Conducting scientific experiments [4,5,6] 5. Research (Biodiversity assessments, Floristic exploration, Field survey) [4,5,6] 6. Reports and scientific papers [4,5,6] 7. Benchmarking [6] 8. Training [4,5] 9. Co-management meetings [4,5] 10. Resource management plans [4,5] 11. Maps [6] 12. Germplasm storage [5] 13. Herbarium [5] 14. Validation of herbal formulas [5] 15. Database of species [5] 16. Livelihood enhancing programmes [4] 17. Providing policy level interventions [4]	1. Scientific data generated on management and conservation by NGO [4] 2. Share information between NGO and community [4] 3. Community capacity building [4,5] 4. Community awareness [4,5] 5. Retrieval of disputed forest land from private owners [5]	1. Facilitate flow of knowledge between local stakeholders and researchers [4,5] 2. Promote the communities' innovative practices in traditional healing [5] 3. Encourage community to conserve resources [4,5] 4. Document plant species [5] 5. Biodiversity conservation [5] 6. Understand how the forest has been accessed by the community, especially for food security [5] 7. Provide information to plan and manage forest resources [6] 8. Community livelihoods [4]	1. Agrobiodiversity is the biodiversity seen in the agricultural landscape or the landscape managed by the community, including the non wood forest products accessed by the community, medicinal plants cultivated or used by the community, and functional biodiversity like pest, beneficial insects, and below ground biodiversity. So NGO looks into that set of biodiversity, with communities participation and their knowledge.[5] 2. Biodiversity of the region is really very high. Forest fragments harbour endangered species of the Western Ghats. But without stakeholder involvement, conservation is not possible. NGO believes that scientific research forms the basis of stakeholder involvement. There is a need to understand patterns by doing rigorous science and share those scientific results to the community and encourage them to be part of the conservation [6] 3. Scientific monitoring protocols are very important to understand the region. But scientific resources are not always available. Therefore, it is important to build community capacity, use traditional knowledge, and encourage the community to monitor and conserve resources [4]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Health					
Nutrition and medicine connected to biodiversity	1. Home garden [5] 2. Distribution of seedlings [5] 3. Trainings [5] 4. Directory of tribal healers [5] 5. Research papers [5] 6. Reports [5] 7. Domestication of wild food species [5]	1. Community awareness [5] 2. Community capacity building [5] 3. Promote the communities [5] innovative practices in traditional healing [5]	1. Understand how the forest has been accessed by the community, especially for food [5] 2. Enhance the homestead food crop diversity [5] 3. Community health [5]		
Improving health	1. Medical Camps [5]	1. Community awareness [5]	1. Community health [5]		
Alternate energy/ materials	1. Research [5,6] 2. Provide funding to farmer groups to set up solar powered fences [6] 3. Providing solar-powered lights [6] 4. Providing LPG cook stoves and fuel [6] 5. Provision of materials for better roofs [6] 6. Set up dedicated fuel coup areas [6] 7. Surveys on species used for fuel and potential impact on wildlife [6] 8. Consultations [6] 9. Lung function tests [6]	1. Increasing community access (especially women) to modern means of energy [5] 2. Shift of community from fuel wood to LPG (mostly women benefited) [6] 3. Many families have reduced their firewood utility by over 70% [6] 4. Tribal people voluntarily agreed to stop cutting trees for roofing in the future [6] 5. Community has lower levels of anxiety and stress and can continue completing their chores after sunset [6] 6. Children can study even at night [6] 7. Usage of LPG helps people's health, especially lung function of women [6]	1. Explore ways in which women's use of modern energy (broadly, electricity, LPG and diesel) is related to their empowerment [5] 2. Improving equitable energy access by influencing policies [5] 3. Protection of cropland from wild animals [6] 4. Reduce human-wildlife conflicts and foster coexistence [6] Reduction of firewood usage has a direct benefit to wild herbivores, and an indirect benefit for large carnivores and reduces impact on forest fragments [6]	1. The use of alternative energy sources may lead to empowerment of women, or empowerment of women may lead to a change in the use of energy. For example, this could include a shift from household-polluting solid biomass to nonhousehold- polluting LPG or use of machinery in agriculture operations [5] 2. Communities near protected areas face high instances of human- wildlife conflict on multiple levels. Many families live on the periphery of protected areas in isolated houses with no electricity connection. Wild animals passing through at night often raid their haystacks and even end up destroying their property. This often results in retaliatory action against the animals [6] 3. Landscape firewood collection is an important cause of forest degradation. For most families, collecting firewood from the forests is arduous with several risks but unavoidable. Smoke from firewood usage is a health hazard affecting people's lungs, especially women [6] 4. The roofs of houses are connected to forests and wildlife in unexpected ways. The tribal people indicated that they are compelled to cut many trees every year to repair their roofs. Additionally, habituated macaques had learnt to remove roof tiles and enter houses in search of food, leading to conflicts [6]	5.

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Climate Change					
Disaster management	1. Education on nature based solutions [5] 2. Education on human and environmental health [5] Community Weather Stations [5] 3. Weather portal [5] 4. Dissemination plan [5] 5. Awareness programme [5] 6. Exposure visits [5]	1. Community awareness building on zoonotic diseases [5] 2. Teachers and students collect and analyse weather data to discuss local changes in climate [5] 3. Teachers and students share collected information with the community [5] 4. Farmers to better understand weather conditions and plan their activities accordingly [5]	1. Encourage general public to conserve biodiversity and forests as a buffer against disasters [5] 2. Provide useful weather information [5] 3. School climate education programme and monitoring systems [5]	1. When environmental health is threatened, zoonotic diseases can hide and then express. There is a need to raise awareness on how environmental health impacts human health [5]	
Climate action	1. Capacity building trainings on carbon neutral activities [4,5] 2. Action plan for carbon sequestration [5] 3. Ecological restoration, monitoring and tree planting [6] 4. Agroforestry promotion [4,5] 5. Technical support on carbon neutral activities [5] 6. Meetings between experts and stakeholders [4,5] 7. Survey [5] 8. Research consortium [5] 9. Nursery [5] 10. Soil organic carbon map [5]	1. Promote community natural resource management practices [5] 2. Community capacity building [5] 3. Increased incomes for communities [4,5]	1. Undertaking research and field-level implementation of carbon neutral activities [5,6] 2. Identify intervention locations [5] 3. Biodiversity conservation [5,6] 4. Carbon sequestration [5,6] 5. Achieving a 'Carbon neutral' district [5] 6. Reduce greenhouse gas emissions [4] 7. Promote climate-smart, forest friendly (biodiversity, pollinator, soil health) agriculture [4,5]		
Networking					
	1. Informal network of ecological restoration practitioners [6] 2. Elephant information network [6] 3. Database of informants [6] 4. University and student network [5] 5. Partnership with grassroots institutions [5]	1. Stakeholders exchange information about elephant presence in the region [6] 2. Involvement of local communities in the planning and decision-making process in addressing issues with human-elephant conflict [6] 3. Involve students in neighbourhood conservation [6]	1. Community conservation [5,6]		
Funding					
Providing funds	1. Scholarships to local students [4] 2. Motivational workshop [4] 3. Provide funding to farmer groups to set up solar powered fences [6]	1. Community capacity building	1. Community capacity building		
Fund raising	1. Approaching funders for funding [5]				

Environmental	Economic	Social	* Planned activities

Appendix B3: Type III NGO interventions

Programmes	Activities/Outputs	Outcomes	Impacts	Reasons	Difficulties
Biodiversity Management					
Nurseries, Seed conservation	1. Planning [8] 2. Nursery [7,8] 3. Training [7] 4. Collection and procurement of seeds and saplings of desired species [7,8] 5. Seed storage [7] 6. Maintenance and raising of saplings [7,8] 7. Provision of plants for restoration activities [7,8] 8. Growing of rare, endangered and threatened plants [7,8] 9. Exposure visits [8]	1. Community capacity building, especially youth to scientifically collect and store seeds [7,8] 2. Community income [8]	1. Conserve germplasm of native species and seed bank for the future [7,8] 2. Increased survival rate (85%) of procured saplings [8] 3. Breed native saplings that may be useful to the community and to the environment as a whole [8] 4. Provide material for ecological restoration [7,8] 5. Steady livelihood for the community [8]	1. Planting requires planning if goal is to conserve species diversity. Also need to ensure that these are well grown species that we are planting [8]	1. The survival of saplings planted from a nursery is poor and the growth rates are extremely slow. Therefore naturally recruited saplings from seeds are much hardier [7]
Tree planting, Ecological restoration, Corridor conservation	1. Planting (native/NTFP) trees and seeds on the degraded lands [7,8,9,10] 2. Ecological restoration [8,9,10] 3. Purchase land all around western Ghats [9] 4. Develop and maintain private forest [9] 5. Tree guards, watering, weeding, fencing [9,10] 6. Maintain and monitor seedlings for 3 years [8,10] 7. Scaling up activities [10] 8. Awareness raising [9] 9. Remove invasive species [8] 10. Interactions with temple committees, community representatives and panchayats [8] 11. Selection of sites [8] 12. Selection of species [8] 13. Provision of labour and material for first two years [8] 14. Providing funding [7,8] 15. MoU with forest department [8] 16. Human-oriented restoration techniques (manual with local tools) [7] 17. Experimental plots [7] 18. Community eco-development groups [7] 19. Work with village Forest Committees and Eco-development Committees [7] 20. Self-help groups formed [7] 21. Capacity building trainings [7]	1. Native tree plantation and maintenance by children, youth, women, local and tribal community [9] 2. Restoration of sacred groves, riparian buffers and forest lands by local community members [8] 3. Planting of native grasses by farmers [8] 4. Community organised to physically stop the forest fire [9,10] 5. Community stops cutting trees for timber [9*] 6. Communities agree to provide infrastructure like fencing etc. [8] 7. Community conserve due to cultural connotations attached to selected sites [8] 8. (Stable [7]) Community income (from labour [7,8,10], carbon credits [10], NTFPs [9,10], timber [10]) [8,9,10] 9. Community awareness [9] 10. Attract tourists by increasing aesthetics of the landscape [10] 11. Community group formation 12. Community members part of restoration teams can plan and carry out restoration activity on their own [7] 13. Community members develop leadership skills [7] 14. Increase in communities self-confidence and social status [7] 15. Community develops sense stewardship and ownership over the forest [7]	1. (Cost effective [7]) Forest restoration and conservation [7,8,9,10] 2. Conserve wildlife and biodiversity [7,8,10] 3. Watershed conservation [7, 8,10] 4. Soil conservation [7,8,10] 5. Increase the survival rate of planted trees [7,8,9] 6. Demonstrate success of reforestation [7,10] 7. Mitigation of global warming [10] 8. Promote and involve local community in forest protection [9,110] 9. Natural organisation of the system, naturally decided community composition [7] 10. Establish forest conservation model [7,9,10] 11. Strengthening the corridor between two areas [7,10] 12. Foster possibility of sustainable forest management in the long term [10] 13. Develop and maintain forest open to all nature lovers [9] 14. Eradication of invasive species [8] 15. Strengthening the boundary against landslides [8] 16. Provide community livelihood [7,8,9,10] 17. Buffer rural populations from the vagaries of agricultural incomes [7]	1. The Western Ghats is hilly area, with very high rainfall that acts as catchment for many rivers. Forests protect the watershed and contribute to mitigating climate change. Many endemic species are endangered by encroachments, overexploitation and agricultural activity. Non-native species dominate degraded regions [7,8,9,10] 2. Grassroots work is essential to understand ground realities and complex challenges and find appropriate solutions. [7] To achieve good conservation, community cooperation is needed [7,8,9,10] 3. Tribal communities understand their environment well and can play a vital role in keeping their heritage intact. By linking conservation with employment, NGO aims to create a sustainable conservation model. They are skilled at restoration fieldwork, and have no fear of the landscapes. NGO does not involve urban volunteers as the environment is highly risky [7,8] 4. Indigenous communities were evicted from the forest 30-40 years ago. They are illiterate and perform casual labour in nearby farms (10-12 days/month). They don't belong to the outside world and have limited exposure. They worry that the outside world will exploit them. There was high levels alcoholism and self-esteem levels were low	1. It is difficult to demonstrate long term benefits to the community. Thus, community involvement is low as no major economic benefits yet. Owners are not interested beyond giving permission for tree plantation on their land [10] 2. Total protection is unworkable in many situations because the owners expect and are dependent on goods, services and profits from their lands and they would not like to lose them. They also have essential needs, like firewood, that they may expect to receive on a sustained basis [10] 3. Planted saplings are in danger of being uprooted by local landowners or browsed by cattle, requiring a lot of monitoring and maintenance [8,10] 4. There is a lot of outmigration from the region with many forest owners resident far from the resource base [10] 5. Local communities are economically underprivileged and engaged in subsistence agriculture. Private forest owners do not have any knowledge in scientific forestry and its benefits and equate forestry with plantation. [10] Capacity building takes a long time [7] 6. Communities are afraid of the government claiming their forests once they have been restored [10] 7. Local politics proves a hindrance [10]

Programmes	Activities/Outputs	Outcomes	Impacts	Reasons	Difficulties
			18. Community awareness to retain ownership of lands and conserve forests [9] and understanding benefits of ecological restoration [8,9,10] 19. Reduce migration from villages [7]	5. Once trust is gained, these communities are happy to participate in forest restoration as it is something they love. Restoration team members know they are doing meaningful work and can see the results. This increases self-esteem levels [7] 6. However, getting the community to trust and participate in restoration-based livelihood options requires sustained institutional support over a long period and income-generating activities encompassing the entire year [7] 7. Private forests are owned by individuals or a group, (often family) but can be accessed by other villagers. Owners don't manage their forests well because they receive insufficient internal incentives from forest conservation. The present management system yields income from timber, firewood for personal use, pasture etc. The local community regularly cuts down all the trees every 3-4 years and is unaware of species importance and may hunt/sell them. There is a need to incentivise to people to conserve the forest through sustainably harvesting forest produce or buy land to protect forests [9,10] 8. Sacred groves are owned by community, Forest Department and temple committees. They are degraded due to large scale conversion but are easier to restore (a contained space with minimal interaction with nearby forests). With many cultural aspects attached to sacred groves, there is no need for awareness building. Riparian buffer conservation was started after massive floods and landslides. Stream beds are owned by local panchayats and interact with local communities. Reserved forest land is controlled by the Forest Department. With the reduction of canopy density, there is a threat of degradation by invasive species [8]	8. NGO must be careful not to put money in a place where there is zero or minimal community engagement. Sometimes, there is conflict over a particular space and NGO has to pull out [8] 9. Local communities are not happy with the NGO's activities as each wants to work on their individual interests. [9] Acceptance of the NGO takes a long time [9, 10] 10. Interactions with temple committees were not productive despite multiple rounds of discussions due to various reasons [8] 11. With each new generation, communities are slowly losing their knowledge and will to save forests. There is a need to keep going back and talking to the community and provide support [9] 12. Women traditionally don't enter those spaces so a lot of work is done by men [8] 13. There are limited financial and manpower resources [10] Difficult to scale up restoration activities as NGO has to wait for enough people to come forward for a restoration team [7] 14. Work is on very tough terrain with only manual labour and highly distributed planting. Activities were interrupted due to elephant and tiger sightings. This slows down the work [8] 15. Forest fire is a big threat as people deliberately set fire to open areas. Most places are grassy and catch fire easily in summer. Fires are destructive to tree plantations [9,10] 16. Seed dibbling takes longer than active restoration [7] while saplings must be drawn from multiple sources and raised are extremely expensive [8]
Invasive species management	1. Removal of weeds like lantana [7,8] 2. Release naturally regenerated saplings [8] 3. Boundary clearing [8] 4. Protocols [7] 5. Experiments [7] Trainings [7]	1. Scientific information on which sites will perform well, which species are required [8] 2. Community income [8] 3. Community receives base raw material for lantana craft by women [7] Provides community firewood for eco-chulla stoves [7]	1. Community livelihood [7,8] 2. High survival rate of native species [8] 3. Increase of naturally regenerated saplings [7,8] 4. Increased biodiversity [7,8] 5. Reduced human animal conflict (more fodder for animals) [8] 6. Suppression and prevention of invasives [7,8] 7. Forest restoration [7]		

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
				9. Assisted natural regeneration is enabled by soil seed bank and nearby seed sources. When the ecosystem has recovered, successional species are introduced by seed dibbling. The resulting naturally recruited saplings are hardier than introduced ones. Additionally a larger area can be covered with less invasive and cost effective method [7] 10. Creating corridors will help connect protected areas and promotes wildlife conservation and is a factor in area selection [10] 11. NGO prefers to work in areas that will yield perceivable outcomes with lower inputs [8]	
Agroforestry	1. Silviculture [10*] 2. Bamboo cultivation [10*] 3. Medicinal plant extraction [10*] 4. Planting and collection of NTFP (spices, fruits, etc.)[10*] 5. Provision of saplings [7*] 6. Survival based incentives to community [7*]	1. Community income from timber, fuel wood, NTFPs, spices, medicinal plants and bamboo [10*] 2. Encouraging community to grow saplings [7*] 3. Availability of fodder facilitates home-fed cattle breeding, reducing the risk of cattle kills by predators [7*]	1. Protection of forests [10*] 2. Encouraging villagers to grow trees on their lands [7*] 3. Trees provide a variety of eco-services to community's e.g. Food, fodder, medicines, timber, etc. [7*] 4. Reduction of human animal conflict [7*] 5. Trees provide habitats to birds and other forms of wildlife [7*] 6. Community livelihood [10*]	1. Provide incentives to communities for forest conservation [10*] 2. Low-cost option for using community's uncultivated lands [7*]	1. Rainfall levels were very low and the water table is quite low in the villages. So communities want to conserve the bore well water for their farming. So social forestry has not succeeded very much [7*]
Management Plans	1. Fund raising [7] 2. Monitoring [7] 3. Reports [7] 4. Discrete restoration plots [7] 5. Plot profiling [7] 6. List of activities [7] 7. Planning [8] 8. Mapping [8] 9. Draft management plan [10] 10. Approval of management plans by the government at different levels [10]	1. Binding rules for protection and sustainable harvesting to promote sustainable management among the community [10]	1. Ensure quality of the restored plot [7]	1. NGO functions as a nodal agency responsible for planning as community capacity building takes time [7] 2. Planting requires planning if goal is to conserve species diversity [8] 3. The project is strengthened as whole community involvement increases. The NGO tries to scale up from individual farmers to the wider community. Interact with the community and make them responsible for protecting the forest [10] 4. As forests are privately owned, community must come forth voluntarily and cannot be forced to conserve forests [10]	1. Drafting a management plan is complex [10] 2. Scaling up requires more funds [10] 3. All stakeholder must be willing to agree to the draft management plan [10]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Conservation agreements	1. Compensation for coconut plantation owners [9] 2. Approaching community [10] 3. Selecting interested participants [10] 4. 5 year conservation agreements with local forest owners [10] 5. Tree plantation on selected areas [10] 6. Incentives to the community after verification [10]	1. Coconut plantation owners maintain the vulture nests in plantation [9] 2. Private forest owners agree to not destroy the forest and allow tree plantation [10] 3. Community self-reliance to conserve forests after 5 years [10*] 4. Applications from private forest owners [10]	1. Monitoring and protection of vulture nests [9] 2. Restoration of forests on private lands [10] 3. Establish forest conservation model [10] 4. Forest restoration [10] 5. Conserve wildlife [10] 6. Foster possibility of sustainable forest management in the long term [10] 7. Provide community livelihood [10]	1. Drastic decline in vulture numbers [9] 2. Conservation of existing forests by paying incentives is more cost-effective than carrying out plantation on degraded land. Incentive-based conservation offers incentives to encourage stakeholders to adopt sustainable management practices. Incentives are generally low, but sufficient to motivate stakeholders [10]	1. Owners are not interested in beyond giving permission for the plantations on their land and so grazing etc. becomes a problem [10] 2. Difficulties in establishing when NGO first started [10] 3. Local politics proves a hindrance [10]
Working on coffee estates	1. Selection of native species to conserve on private estates [8] 2. Selection of sites on coffee estates for planting [8] 3. Provision of saplings for planting [8] 4. Interaction with coffee owners [8] 5. Ecological restoration [8] 6. Maintenance of restored area [8]	1. Plantation of native species by coffee estates [8] 2. Labour provided by estate owners [8]	1. Long term engagement with coffee estates [8] 2. Increasing canopy cover on coffee estates [8] 3. Conservation of native species diversity on coffee estates [8] 4. Encourage coffee estate owners to plant native species [8] 5. Reducing mono-cropping of exotic species [8]	1. Large and small patches of privately owned land that fragment the forest and have lower canopy cover that have certain pockets that they don't use for coffee. NGO attempts to conserve trees in those pockets or on tank bunds, you know. [8]	
Managing human wildlife conflict	1. Ecological restoration [7,8] 2. Survey [7]	1. Community restores forest areas [7,8] 2. Crop raids by animals, particularly elephants has reduced [7,8]	1. Vegetation and grass cover in forests increased [7,8] 2. Reduction of human-wildlife conflict [7,8]	1. The restoration area is an elephant corridor. Most human-wildlife conflict mitigation strategies focus on developing technologies that will obstruct elephants. NGO believes that conflict will continue as long as the forests are degraded as they have not food source. Therefore by improving the forests and vegetation, reduces significantly the need for animals to come out of the forest [7]	1. Hard to convince other conservationists about the value of restoration in reducing human-wildlife conflict [7]
Wildlife Conservation	1. Informal and formal interactions with village heads, assemblies and institutions [9] 2. Meetings with the tribal community [9] 3. Night patrolling with local field guide [9] 4. Fencing of vulture feeding sites [9] 5. Research [9] 6. Camera trap [9] 7. Involving locals in pangolin studies [9] 8. Trainings [9] 9. Monitoring [9] 10. Attending and presenting at scientific conferences [9] 11. Lectures, presentations and documentary in educational institutions [9] 12. Training workshop [9]	1. Increased awareness for general public [9] 2. Educated and sensitized educational institutions [9] 3. Sensitize stakeholder villagers, and tribal community [9] 4. Pangolin rescue by community in collaboration with Forest Department [9] 5. Regular monitoring vulture nesting and feeding activities by NGO [9] 6. Attracting tourists to watch the release of hatchlings [9] 7. Increasing scientific data on wildlife [9] 8. Increased income for communities from pangolin surveys and tourism [9]	1. Established Human-Pangolin religious relationship [9] 2. Raising awareness and encouraging conservation of these species [9] 3. Understanding species ecology and behaviour [9] 4. Reducing deforestation and conserving the natural habitat [9] 5. Wildlife conservation [9,10] 6. Livelihood generation [9]	1. Pangolin is the most trafficked mammal species in the world [9] 2. Drastic decline in vulture numbers [9] 3. NGO believes that only when local communities are involved in conservation activities will the project be successful in the long term [9] Communities are unaware of species importance and may hunt/sell them. They have been accepting the need for conservation and change very slowly but steadily after NGO started conservation activities and educational activities [9]	1. It is not possible to see pangolin in the jungle. Tourism with only the pangolin is very difficult. However, there are other attractions like birds, flowers, and general flora and fauna. That can be shown by the locals, that is possible but that is little tough compared to other species [9]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	13. Awareness workshops and materials Eco-friendly information awareness board [9] 14. Quiz, essay writing and drawing competition [9] 15. Pictorial story book [9] 16. Mascot creation [9] 17. Folk dances, street plays, statue of pangolin in the temple [9] 18. Regular field visits for citizens [9] 19. Pangolin and turtle festival [9] 20. Beach cleanliness drive [9] 21. Marine turtle conservation centre [9] 22. Ecological restoration [10]	9.	7.	4. Local communities get money if tourists come and stay in their villages and houses. They know that if animals are there, there will be tourists and if tourists, there is income. So if animals are there then only can they get the money. Thus, they conserve wildlife [9]	2.
Monitoring	1. Monitoring of conservation activities [9] 2. Monitoring of restoration plots [7] 3. *Monitoring and maintenance of restored areas* [8] 4. *Research* [8]	1. NGO can make sure the nothing goes wrong and provide solutions if needed [7,8,9]	1. Ensure success of the project [7.8.9] 2. Establish restored areas are doing well [7,8]	1. NGO must be regularly in touch with communities and provide support [9] 2. Planted saplings are in danger of being uprooted by local landowners or browsed by cattle. This slows down the work [8]	1. Restoration is a variable activity. After being active in the region for a few years, NGO has a better understanding of quality. But the NGO does not wish to put specific time targets on community restoration teams because each plot is different [7]
Community monitors/ Stewards	1. Identification of local knowledgeable individuals or with aptitude [7,9] 2. Orientation of local community rangers [7,9] 3. Trainings on basic aspects of ecology and wildlife [7] 4. Community Eco-champions [7] 5. Night patrolling with local field guide [9]	1. Community monitoring of endangered species [9] 2. Positively influence the behaviour of the community as a whole towards the environment [7] 3. Foster growth of local conservationists [7]	1. Monitoring and protection of endangered species [9] 2. Facilitate shifting of ownership for conservation interventions from urban conservationists to local ones [7]	1. Historically, forest dwelling people had good native knowledge of ecology and responsible behaviour towards their environments. Tribal communities can play a vital role in keeping ecological heritage intact. Additionally, conservation efforts not owned by local communities are less likely to succeed in the long run. However, modernization and exposure to urban influences have diminished this knowledge, especially among the younger generation [7]	
General	1. Motivate villagers to put out forest fires [9,10]	1. Villagers help put out forest fires [9,10]	1. Fighting forest fires [9,10] 2. Protecting forests [9,10]		1. People set forest fires on purpose [10]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Alternate Livelihoods					
Apiculture	1. Training [7,9] 2. Workshop [9] 3. Market products [7] 4. Provision of beehive and other equipment [9] 5. Awareness building [9] 6. Promote beekeeping [10*]	1. Inspire locals to collect of NTFPs [9] 2. Community skill development and capacity building [7,9] 3. Educate and sensitize community locals, tribal, youngster and women on conservation of native honeybee, its importance and economical values [9] 4. Community income [7,9,10*] 5. Employment for women [7*]	1. Biodiversity conservation [7,9] 2. Increase bee populations and pollination [7,9] 3. Fosters healthy inter-dependence between people and ecology [7] 4. Community livelihood [7,9,10*] 5. Build awareness among the community [9] 6. Gaining support of the entire village community [10*]	1. Communities are historically nomadic with a low affinity for agriculture. They lead a subsistence existence as casual labourers in nearby farms 3-4 months a year. Communities are economically challenged as agriculture is unviable and other employment opportunities are scarce. Eco-based employments create creates a win-win situation and a model of conservation that is inclusive and self-sustaining [7,9] 2. Many tribal communities are traditional honey gatherers. Limitations in collecting honey from the forests have led to the abandonment of traditional craft. Apiculture is in tune with their traditional skill sets [7] 3. Honeybees play a vital role in pollination and are responsible for producing major foods. Native honeybees face major threats (loss of habitat, use of pesticide in agriculture, and chemical industrial development) [9] 4. Honey can be produced by collection of forest beehives or by bee keeping by the villagers. Bee keeping is a low labour activity and can be managed by an hour or two of attention every day [10] 5. Alternative employment helps people see the need for conservation [9] 6. Private forest owners live in a village community. Though the land is privately owned, in practice the village community may use the resources on the land for firewood and pasture, as a commons, the extent of which varies from village to village. Under a protection regime, other villagers stand to lose the benefits and may not support conservation. Owners may face resistance from other villagers, pilferage of forest produce, or non-cooperation with villagers continuing to use these lands as they are used	1. Training, equipment and investment are needed. Ideally, this would be a group activity to share expenses [10*]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
				to. The support of the other villagers is necessary. Providing alternative benefits may gain this support [10*]	
Agriculture	1. Training [9] 2. Workshop [9] 3. On-field support [9] 4. Experimental farming [9] 5. Introduce new agricultural methods [9] 6. Farmer's meeting [9] 7. Documentary screening [9] 8. Raising awareness [10]	1. Encourage farmers to adopt low-input, zero-till, low-emission and climate smart rice cultivation technique [9] 2. Farmers take up organic farming [10] 3. Community awareness [10]	1. Provide alternate sustainable livelihood [9,10] 2. Understand profitability and various factors for growing crops [9] 3. Increase yields [9] 4. Increase resilience to adverse climatic conditions [9] 5. Promote organic farming [10] 6. Gaining support of the entire village community [10]	1. Alternative employment helps people see the need for conservation [9] 2. Private forest owners live in a village community. Though the land is privately owned, in practice the village community may use the resources on the land for firewood and pasture, as a commons, the extent of which varies from village to village. Under a protection regime, other villagers stand to lose the benefits and may not support conservation. Owners may face resistance from other villagers, pilferage of forest produce, or non-cooperation with villagers continuing to use these lands as they are used to. The support of the other villagers is necessary. Providing alternative benefits may gain this support [10*]	
NTFP collection and value addition	1. Training [9*] 2. Promote value addition of NTFPs [10] 3. Collaborate with local groups [10] 4. Provide facilities to make NTFP products from fruit and for traditional medicines [10] 5. Silviculture [10*] 6. Bamboo cultivation [10*] 7. Medicinal plant extraction [10*] 8. Planting and collection of NTFP (spices, fruits, etc.)[10*]	1. Community capacity building [9*,10] 2. Community income [9*,10] (Income from timber, fuel wood, NTFPs, spices, medicinal plants and bamboo [10*])	1. Community livelihood [9*,10] 2. Biodiversity conservation [9*,10*]	1. There is a demand for forest products like fruits and medicines that may provide increased income to the community and incentive to conserve forests [10]	1. Local communities are economically underprivileged and engaged in subsistence agriculture. Private forest owners do not have any knowledge in scientific forestry and its benefits and equate forestry with plantation [10] 2. Total protection is unworkable in many situations because the owners expect and are dependent on goods, services and profits from their lands and they would not like to lose them. They also have essential needs, like firewood, that they may expect to receive on a sustained basis [10] 3. There is a lot of outmigration from the region with many forest owners resident far from the resource base [10] 4. Local communities are not happy with the NGO's activities as each wants to work on their individual interests [9] 5. Not much attentions paid to this activity as tree plantation takes up too much time [10]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
	9.	3.	3.	2.	6. Communities afraid of government claiming their forests once they have been restored [10] 7. There are limited financial and manpower resources [10]
Marketing	1. Create a market for NTFP products through Forest Department and other departments [9*] 2. Trainings [10] 3. Marketing [10]	1. Community income [9*] 2. Community capacity building [10]	1. Community livelihood [9*] 2. Biodiversity conservation [9*]	1. NGO tries to convince people not to cut down forests as they can get the same income by harvesting some forest products each year [9*]	1. Only partially successful because the area is isolated areas and there is not much of a market for these products [10]
Other skills	1. Wildlife vocational skills workshops [7] 2. Trainings [7,9,10] 3. Planting and restoration activities [7,8] 4. Nursery training [8] 5. Online shop for product sale [10] 6. FSSAI registration for food products [10]	1. Building skills in local youngsters like wildlife observation, conducting nature trails, conservation techniques and hospitality skills [7] 2. Women make articles and foodstuff [9,10] 3. Capacity building of local women [9,10] 4. Community capacity building [7,8,9,10] 5. Enable local youngsters to work with wildlife research NGOs, the forest department and wildlife resorts [7] 6. Community income [7,8,9,10]	1. Community livelihoods [7,8,10] 2. Revive traditional knowledge and the connection of communities to their environment [7] 3. Fosters healthy inter-dependence between people and ecology [7] 4. Biodiversity conservation [9] 5. Gaining support of the entire village community [10]	1. Historically, forest dwellers have had good native ecology knowledge and responsible behaviour towards their environments. However, modernization and exposure to urban influences have diminished this knowledge, especially among the younger generation [7] 2. Indigenous communities are preferred for the fieldwork, as they are skilled and have no fear of these landscapes [8] 3. Alternative employment helps people see the need for conservation [9]	1. Only partially successful because the area is isolated areas and there is not much of a market for these products [10]
Payment for Ecosystem services	1. Selling carbon credits/offsets [10]	1. Income generated for community in exchange for forest conservation [10]	1. Biodiversity conservation [10] 2. Alternate income for community [10]	1. Payment for ecosystem services is applicable when deforestation is only marginally more profitable than conservation and monetary incentives can tip the balance in favour of conservation or improved forest management. The primary motivation of private forest owners is monetary profit. In absence of monetary profit, the land is considered as unproductive and assigned low importance [10]	1. The right buyers take considerable time and effort to find [10] 2. Considerable planning is necessary and long drawn out negotiations are likely with large number of stakeholders [10] 3. Very low rates are offered for carbon offset which are insufficient to fund tree plantation or interest the community [10] 4. The other important monetary factor is sale of land to urban businessmen and land developers. At locations near urban centres the price offered for sale of land may be so high that no PES scheme will be able to pay sufficient incentive [10]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
			Capacity Building		
Strengthening village institutions	1. Community eco-development groups [7] 2. Work with village Forest Committees and Eco-development Committees [7] 3. Trainings [7]	1. Communities take an active part in restoration planning and decision making [7] 2. Communities learn to run self-help group meetings [7] 3. Community team leadership is built up [7]	1. Inclusion of communities in restoration activities [7]	1. Historically, forest dwellers have had good native ecology knowledge and responsible behaviour towards their environments. However, modernization and exposure to urban influences have diminished this knowledge, especially among the younger generation [7]	
Village Savings	1. Savings account [7] 2. Community discussions [7] 3. Trainings [7]	1. Community has savings in the bank or having a fixed deposit [7] 2. Communities operate bank accounts [7]	1. Financial security for the community [7]		1. Community members are illiterate and they are very scared. They feel that the bank people don't respond to them correctly, they don't know how to interact with the bank staff. So they are very scared about keeping their money in the bank [7]
Gender Equality	1. Trainings [7,10] 2. Online shop for product sale [10] 3. FSSAI registration for food products [10] 4. Providing base materials [7]	1. Women make articles, lantana furniture, apiculture and foodstuff [7,10] 2. Capacity building of local women [7,10] 3. Community income for women [7,10]	1. Community livelihoods [10] 2. Increased livelihood options [7] 3. Gaining support of the entire village community [10] 4. Increased quality of life for the community [7] 5. Reduced pressure on restored area [7]	1. Need to look for a convergence of restoration goals and community aspirations if conservation is to succeed. Ecological restoration is not an isolated activity. It is connected to other activities that happen around the restoration area (firewood collection, farming with chemical inputs) which can affect the restored area [7]	1. It is not easy to scale up these activities because creating the market for the products is not easy and sustaining more groups requires a large market.
Others	1. Wildlife vocational skills workshops [7] 2. Trainings [7,8,9,10] 3. Planting and restoration activities [7,8] 4. Nursery training [8] 5. Provide initial funding for basic materials [8] 6. Buying saplings for planting from the community nurseries [8] 7. Buyers for collected seeds [8] 8. Exposure visits [8] 9. Provide lists of required seeds and demand quality service [8] 10. Interactions with experts [8] 11. Field supervisor [8] 12. Creating nature interpretation / learning centre [8*] 13. Creating local knowledge base on floral species [8] 14. Provide technical, knowledge and monetary support for biodiversity conservation initiatives [8]	1. Building skills in local youngsters like nursery management, wildlife observation, conducting nature trails, conservation techniques and hospitality skills [7,8] 2. Community capacity building, especially students and youth [7,8,9] 3. Increase knowledge of community youth [8] 4. Community involvement in creating learning spaces [8*] 5. Community awareness [8*] 6. Enable local youngsters to work with wildlife research NGOs, the forest department and wildlife resorts [7] 7. Community income [7,8,9,10]	1. Revive traditional knowledge and the connection of communities to their environment [7,8] 2. Fosters healthy inter-dependence between people and ecology [7,8] 3. Biodiversity conservation [9] 4. Engage and empower communities in the process of sustainable ecological conservation by providing suitable knowledge and resources [8] 5. Instil a sense of conservation among the people [9] 6. Community livelihoods [7,8,9] 7. Gaining support of the entire village community [10]	1. Historically, forest dwellers have had good native ecology knowledge and responsible behaviour towards their environments. However, modernization and exposure to urban influences have diminished this knowledge, especially among the younger generation [7] 2. Farmlands distressed by human-animal conflicts. They can't grow paddy and most food crops. There is a need to provide employment to youth. NGO targets youth who are concerned and passionate about the environment [8] 3. NGO sees ecological conservation as an “offering” for future generations by collaborating and co-creating with other likeminded communities and organizations. [8]	1. A lot of effort and education required [8] 2. Women traditionally don't enter those spaces. NGO hopes to involve women through these activities [8] 3. There are difficulties in prompting collective action among the youth as they are not exposed to the benefits of such activities [8]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
			Awareness Building		
Awareness building, Conservation education, Citizen Science	1. Film shows [7] 2. Safaris [7] 3. Identifying committed individuals, communities, schools , temples for space for ex-situ conservation [8] 4. Creating nature interpretation / learning centre [8*] 5. Community awareness programmes [8,9] 6. Creating local knowledge base on floral species [8] 7. Tagging of species for its scientific and local names [8] 8. Documenting the uses [8] 9. Medicinal garden/ Butterfly garden [8*] 10. Provide technical, knowledge and monetary support for biodiversity conservation initiatives on an on-going basis [8] 11. Folk dances, street plays, statue of pangolin in the temple [9] 12. Field visits, nature trails and bird watching [9] 13. Celebrating Festivals and World Pangolin Day [9] 14. Mobile exhibition [9] 15. Distribution of awareness leaflets [9] 16. Eco-friendly information awareness board and poster [9] 17. Pictorial story book [9] 18. Mascot creation [9] 19. Informal and formal meetings with local and tribal communities [9] 20. Brochures [10] 21. School visits [10] 22. Wildlife education camps [7] 23. Training to school students [9] 24. Provide equipment [9] 25. Lectures, presentations and documentary in educational institutions [9] 26. Quiz, essay writing and drawing competition [9] 27. State level photography exhibition [9]	1. Give village children an opportunity to observe and learn from nature [7] 2. Community involvement in creating learning spaces [8*] 3. Community awareness [8,9,10] 4. Increased awareness for general public [9] 5. Environmental education for students [10] 6. Help NGO members get a better understanding of different aspects of ecology [7] 7. Collection and analysis of camera trap data by school children [9] 8. Collected data repository available to scientists [9] 9. Setup ex situ conservation plots of Rare, Endangered, Threatened (RET) trees of Western Ghats involving communities [8]	1. Improve community's understanding of the role of the forests in conservation [7] 2. Revive traditional knowledge and the connection of community with their environment [7] 3. Engage and empower communities in the process of sustainable ecological conservation by providing suitable knowledge and resources [8] 4. Wildlife conservation [9] 5. Create working model of conservation [8] 6. Improve awareness on need for biodiversity conservation [8,9] 7. Establish human-pangolin religious relationship [9] 8. Sharing of scientific data [9] 9. Promote scientific understanding among school children through applied scientific research [9]	1. Historically, forest dwellers have had good native ecology knowledge and responsible behaviour towards their environments. However, modernization and exposure to urban influences have diminished this knowledge, especially among the younger generation [7] 2. NGO sees ecological conservation as an “offering” for future generations by collaborating and co-creating with other likeminded communities and organizations. [8] 3. Communities unaware of species importance and may hunt/sell these animals. The people have been accepting the need for conservation and change very slowly but steadily after NGO started conservation activities and educational activities [9] 4. There is a lack of demonstration projects on scientific forestry. In absence of this, there is likely to be misunderstanding about the nature of forestry [10] 5. The NGO founders did not have prior expertise in forest restoration and in community based conservation [7]	1. As it was not possible to deploy cameras and record activities during the monsoons, the schools were advised to take them off and keep them safely [9]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Advocacy					
Policy comments	1. Policy advocacy [10]	1. Passing of laws and policies by the state government [10]	1. Encourage policy changes to protect private forests based on success of NGO interventions [10]		
Liaising with Government Departments	1. Night patrolling with local field guide [9] 2. Create a market for NTFP products through Forest Department and other department [9*] 3. Work with government to involve the community in restoration activities [7] 4. Mapping [8] 5. Selection of species [8] 6. Provision of labour [8] 7. Provision of funding [8] 8. MoU with forest department [8] 9. Monitoring and maintenance for three years [8] 10. Highly distributed sapling plantation [8]	1. Collaboration with different stakeholders, including the official agencies that take care of forests [7] 2. Community inputs are taken into consideration [7] 3. Employment for indigenous communities [8] 4. Increasing community income [9*] 5. Pangolin rescue by community in collaboration with Forest Department [9] 6. Local communities are engaged in restoration [7]	1. Conservation of pangolins [9] 2. Biodiversity conservation [7,8,9*] 3. Suppression of invasive species [8] 4. Livelihood generation [7,8,9*] 5. Community economic status improves [7]	1. The Forest Department is very keen that restoration work is done only by the local community [7] 2. Collaboration with different stakeholders, including the official agencies, is key to success [7] 3. Reserved forest land is controlled by the forest department with unattended land spaces with high rate of wildlife interactions. With the reduction of canopy density, there is a threat of invasive species taking over [8]	1. Work is on very tough terrain with only manual labour and highly distributed planting. Activities were interrupted due to elephant and tiger sightings. This slows down the work [8]
Communication					
Traditional Knowledge	1. Wildlife vocational skills workshops [7] 2. Trainings [7] 3. Partner with local self-help groups [7] 4. Manual restoration activities without heavy equipment [7] 5. Creating local knowledge base on floral species [8*] 6. Creating of a team of well-equipped restorers [8] 7. Awareness building [8]	1. Use of community traditional knowledge in restoration benefits the forest [7,8] 2. Facilitate knowledge transfer from tribal elders to youths [7,8] 3. Community involvement in creating learning spaces [8] 4. Community capacity building [7,8] 5. Building skills in local youngsters like wildlife observation, conducting nature trails, conservation techniques and hospitality skills [7] 6. Enable local youngsters to work with wildlife research NGOs, the forest department and wildlife resorts [7] 7. Year-round employment for both community men and women [7]	1. Ecological Restoration [8] 2. Fosters healthy inter- dependence between people and ecology [7] 3. Identification of finer ecological niches - Not much damage to the forest compared to use of heavy machinery [7] 4. Revive traditional knowledge and the connection of communities to their environment [7,8] 5. Community livelihoods [7,8]	1. Historically, forest dwellers have had good native ecology knowledge and responsible behaviour towards their environments. However, modernization and exposure to urban influences have diminished this knowledge, especially among the younger generation [7] 2. Conventional rehabilitation of indigenous people focuses on training them in non-forestry vocational skills. These have limited success due to challenges communities face in integrating with mainstream society. Many end up in unskilled jobs in villages and small towns [7] 3. There is also a loss of traditional knowledge because of community disconnect with forests. Such knowledge is passed from one generation to another experientially, and any break in this chain leads to its permanent loss [7] 4. The self-help groups are from indigenous communities. Partnering with them to carry out the restoration allows traditional community knowledge to be used in conservation work. Traditional	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
				knowledge doesn't have enough focus in general conservation work and because of that the knowledge is getting lost. [7]	
Trust building	1. Smoke free and low fuel chullas (stoves) [7] 2. Gujarat boiler to heat bathing water [7] 3. Trials with alternate technology [7]	1. Reduce community firewood consumption by 70% - 85% [7] 2. Reduction in forest forays by communities for firewood collection by 65% [7] 3. Reduces the smoke in the kitchen by 90%, benefitting the health of women [7] 4. Saves villagers 60% of the time [7] 5. Increased participation of communities [7]	1. Establishes trust between community and NGO [7] 2. Increase quality of life for the community [7] 3. Reduce pressure on restored area [7] 4. Reduce human-animal conflicts [7] 5. Reduce spread of invasive weeds [7]	1. It is very important for any external organization to win community's trust. This depends on NGO sincerity. Communities look for people sustainably work for a long period. People are very wary of NGOs who only do short term work [7] 2. Need to look for a convergence of restoration goals and community aspirations if conservation is to succeed. Ecological restoration is not an isolated activity. It is connected to other activities that happen around the restoration area (firewood collection, farming with chemical inputs) which can affect the restored area [7] 3. A single traditional stove consumes around 15 kg of firewood/day and over 5 tonnes/year. This leads to repeated felling of wild juvenile trees and creates human-animal conflicts when people go into the forest to gather firewood [7]	1. Indigenous communities are very introverted and not happy to interact with outsiders after going been through many NGOs and bad experiences. However, they were very keen to start restoration works. Communities' native intelligence is excellent and makes them good judges of character. Thus trust-building takes a long time and requires repeated interactions [7]
Watershed Management					
	1. Water harvesting [7] 2. Water trenches [7] 3. Ponds [7,8] 4. Low-cost check dams [7] 5. Work with Village Forest Committees [7] 6. Contour trenches [7] 7. Gully plugs [7] 8. Ecological restoration [7,8]	1. Community implements water harvesting methods in forests [7] 2. Planting of native grasses by farmers [8]	1. Increased availability of water for wild animals and plants in the dry seasons [7] 2. Water table in downstream village lands also improves significantly [7] 3. Arrest soil erosion [7] 4. Increase percolation of water [7] 5. Increase the moisture availability for plant [7] 6. Riparian buffer enhancement [8]	1. Most forest areas in South India have limited rain cover and remain dry for a large part of the year [7] 2. These environments are very harsh (degraded soil, non-functional ecosystem parameters, low resilience) There is very low rainfall and few rainfall days. Plants must have moisture at least till they establish. Naturally recruited saplings are much healthier but require support through water harvesting [7] 3. Western Ghats is called the "Water Tower" of peninsular India and forms the catchment area for complex riverine drainage systems that drain almost 40% of India. [8]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Research					
	1. Survey (Biodiversity Human wildlife conflict, Bird, Camera traps, Questionnaire) [7,9,10] 2. Experimental plot [8] 3. Community interactions [8,9] 4. Attending and presenting at scientific conferences [9] 5. Baseline data [9] 6. Document and collect data on species ecology, presence and behaviour in wild [9] 7. Reports [10] 8. Presentations [10]	1. Continuous joint knowledge development between NGO and community [7] 2. Influence selected communities towards ecological restoration [8] 3. Community income [8,9]	1. Create working model of grassroots conservation [8] 2. Increasing scientific data on wildlife [9,10] 3. Scientific information on effects of restoration [7] 4. Understand about how about how the community feels about NGO [8] 5. Livelihood generation [8,9]	1. After learning to conserve small private land, NGO wished to scale up. Private land had advantages (contained space with no tenure issues), and NGO could focus on raising saplings [8] 2. NGO had access the 100 species they wished to conserve including biologically important species, edible species, rare endangered and threatened tree species and medicinal species [8] 3. Private forests used for firewood, shifting cultivation etc. but their impacts are not known [10]	1. Local land conditions were adverse since it was devoid of tree cover [8] 2. The moisture content on the land was low with cracked soils during summer [8] 3. Because of *Lantana* and dryness, there was difficulty in attracting [8]
Health					
Nutrition and medicine connected to biodiversity, Improving health	1. Creating local knowledge base on floral species [8] 2. Tagging of species for its scientific and local names and documenting the uses [8] 3. Medicinal garden [8] 4. Provide technical, knowledge and monetary support for biodiversity conservation initiatives on an on-going basis [8] 5. Medicinal plant extraction [10] 6. Planting and collection of NTFP (spices, fruits, etc.)[10] 7. Solid waste management [9] 8. Blood and organ donation drives [9]	1. Community involvement in creating learning spaces [8] 2. Community awareness [8] 3. Income from timber, fuel wood, NTFPs, spices, medicinal plants and bamboo [10]	1. Engage and empower communities in the process of sustainable ecological conservation by providing suitable knowledge and resources [8] 2. Protection of forests [10] 3. Livelihood generation [10]	1. Most of restoration species have nutritional/ medicinal value in local tribal medicine. Conservation of these species ensures higher availability for local, community driven health care [8]	
Alternate energy/materials	1. Smoke free and low fuel chullas (stoves) [7] 2. Gujarat boiler to heat bathing water [7] 3. Trials with alternate technology [7]	1. Reduce community firewood consumption by 70% - 85% [7] 2. Reduction in forest forays by communities for firewood collection by 65% [7] 3. Reduces the smoke in the kitchen by 90%, benefitting the health of women [7] 4. Saves villagers 60% of the time [7] 5. Increased participation of communities [7]	1. Establishes trust between community and NGO [7] 2. Increase quality of life for the community [7] 3. Reduce pressure on restored area [7] 4. Reduce human-animal conflicts [7] 5. Reduce spread of invasive weeds [7]	1. It is very important for any external organization to win community's trust. This depends on NGO sincerity. Communities look for people sustainably work for a long period. People are very wary of NGOs who only do short term work [7] 2. Need to look for a convergence of restoration goals and community aspirations if conservation is to succeed. Ecological restoration is not an isolated activity. It is connected to other activities that happen around the restoration area (firewood collection, farming with chemical inputs) which can affect the restored area [7]	1. Indigenous communities are very introverted and not happy to interact with outsiders after going been through many NGOs and bad experiences. However, they were very keen to start restoration works. Communities' native intelligence is excellent and makes them good judges of character. Thus trust-building takes a long time and requires repeated interactions [7]

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
				3. A single traditional stove consumes around 15 kg of firewood/day and over 5 tonnes/year. This leads to repeated felling of wild juvenile trees and creates human-animal conflicts when people go into the forest to gather firewood [7]	
			Climate Change		
Disaster management	1. Interaction with local panchayats [9] 2. Selection of riparian species [9] 3. Provision of planting materials [9] 4. Sponsoring of planting material [9] 5. Plantation along stream beds [9] 6. Community engagement and guidance [9] 7. Monitoring and maintenance for three years [9] 8. Research [9] 9. Remove invasive species [9] 10. Plant native species [9] 11. Ecological restoration [9]	1. Increasing communities' understanding of the benefits of riparian buffers [9] 2. Livelihood for indigenous communities [9] 3. Planting of native grasses by local communities [9] 4. Restoration of riparian buffers and landslides by local community members [9] 5. Planting of native grasses by farmers [9]	1. Understanding dangers to saplings in the region [9] 2. Strengthening the boundary against landslides [9] 3. Landslide and riparian Eco restoration [9] 4. Reduction in disasters Lower risk of flooding and landslides [9] 5. Degraded land restored [9] 6. Reduce soil erosion [9] 7. Riparian buffer enhancement [9]	1. NGO felt this it was necessary to focus on this intervention after severe floods and landslides in the past few years, wherever there are communities who are willing to work on it. [9] 2. Ownership by local village panchayats requires a lot of interaction with the local communities [9]	
			Networking		
	1. Informal network of ecological practitioners [7] 2. Network with other stakeholders [7] 3. Raising funds [7,8] 4. Becoming trustees of local NGO [8] 5. Conversations and discussions [8] 6. Consultancy [8] 7. Data repository [9] 8. Attending scientific conferences [9]	1. Sharing of information and knowledge resources and expertise between forest managers (forest department), funders and knowledge partners [7,8,9] 2. Local NGO becomes front ending to interact with community [8] 3. Creating data repository used by scientists globally [9]	1. Affordable model of conservation [8] 2. Successful eco-restoration [8] 3. Easier interactions with the community [8] 4. Awareness building on conservation of wildlife [9]	1. The NGO founders did not have prior expertise in forest restoration and community based conservation. Hence, they contacted other academic bodies to ensure realization of their objectives [7] 2. Collaboration with different stakeholders, including the official agencies, is a key to success [7] 3. Every NGO has its own role. NGOs with different mandates can work together to form a multi-layered networks to have the most impact with least amount of resources [8] 4. A local NGO existed in the region which was not doing fieldwork but had very good community connections and believed in the same principles. This allowed the NGO to take the path of least resistance to interact with the community that did not take too much time or effort to convince them. [8]	

Programmes	Activities/Outputs General	Outcomes	Impacts	Reasons	Difficulties
Funding					
Providing funds	1. Urban sponsorship for Eco restoration [7] 2. Payment for labour [8] 3. Payment for materials [8]	1. Increased, year round income [7] 2. Stable monthly revenues to the communities [7,8] 3. Community members part of restoration teams can plan and carry out restoration activity on their own 4. Community members develop leadership skills [7] 5. Community develops sense stewardship and ownership over the forest [7] Great improvement in community confidence levels [7] Increase in status of restoration community members among the larger community [7] 6. Increased community awareness [8] 7. Community involvement [8]	1. Increase community livelihood [7,8] 2. Buffer rural populations from the vagaries of agricultural incomes [7] 3. Improve forest cover [7] 4. Protect precious migratory corridors [7] 5. Provide incremental ecosystem services [7] 6. Create sustainable conservation model [7] 7. Reduce migration from villages [7]	1. Getting the community to trust and enthusiastically participate in restoration-based livelihood options requires sustained institutional support over a long period. It also requires income-generating activities encompassing the entire year [7]	1. Capacity building takes a long time as community is mostly illiterate. [7] 2. Difficult to scale up restoration activities as NGO has to wait for enough people to come forward for a restoration team [7]
Fund raising	1. Fund raising [7,8,10] 2. NGO members participated in 22km run [9]	1. Funds from interested corporate sand other donors [7,8,9,10]	1. Support NGO activities [7,8,9,10]		1. Funding is a major limitation in scaling up activities [10]

Appendix C: Design Principles

Italics –Narrative

Regular - Overview

Appendix C1: NGO 1 - Design principles

NGO 1												
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
	Implement Forest Rights Act	Training and tools for mapping	Not required, inherent in inbuilt indigenous values	Left to the community, through the Gram Sabha	Strengthening Gram Sabhas	Trainings	Have not much need	Such as talking to the parties, but it is not much needed	Protests, legal cases, Implement Forest Rights Act	Interventions at different scales and levels	People approach the NGO based on previous interventions	Trainings
Biodiversity Management												
Tree planting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ecological restoration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Invasive species management	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Management Plans	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Management plan									
Alternate Livelihoods												
Agriculture	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NTFP collection and value addition	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Formalising harvests											
Marketing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Farmer Producer Organisation	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes
	Community Rights	Community Rights								Meetings at different levels	People come together based on intervention success	People gain confidence and ability to solve their issues
Lantana furniture	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
Other skills	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Training, *Skill development*
Tenure Interventions												
Filing claims	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	Yes	N/A	Yes	N/A
	Rights to collect forest produce	Community Rights	Planned activities for sustainable management						Government recognition of rigts		Exposure visits	

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Mapping	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
		Mapping of traditional boundaries, GPS units provided										Trainings
Capacity Building												
Strengthening village institutions	N/A	N/A	N/A	Yes	Yes	N/A	N/A	N/A	Yes	N/A	Yes	Yes
				Gram Sabha has monetary control over NTFPs	Inclusion of all adults in Gram Sabhas				Gram Sabha decisions are recognised under law		Exposure visits	Democratic decision making village bodies in Gram Sabha
Village Savings	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
				Gram Sabha has monetary control over NTFPs								Democratic decision making village bodies in Gram Sabha
Gender Equality	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes
				Community organisation					Liaising with the government		Exposure visits; previous work	Trainings and schools
Others	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Skill development and capacity building
Awareness Building												
Awareness Building	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes
					Youth Participation							Awareness raising, *Social Education*
Advocacy												
Policy comments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes
									Protests, legal cases, etc.		Prevent evictions; trust building	Community capacity
Lobbying/Protesting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes
									Advocacy		Exposure visits	People gain confidence issues

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Communication												
Traditional Knowledge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Conserve tribal culture especially among youths
Watershed Management												
Watershed management	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Provision of water filters	
Research												
Research												
Health												
Nutrition and medicine connected to biodiversity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Conserve tribal culture especially among youths
Climate Change												
Disaster management	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Networking												
Networking												
Funding												
Fund raising	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C2: NGO 2 - Design principles

	NGO 2											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	Yes	Yes	Yes	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes
	Tenure and access claims	Mapping	Microplans		Youth and women empowerment	Joint patrolling			Forest Rights Act implementation	Different scales and different levels	Networking, people asking for NGO intervention	Training
Biodiversity Management												
Seed conservation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Training, *Food sovereignty*
Tree planting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Management Plans	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
			Management Plan, *Microplans*						Negotiation with Forest Department			
Alternate Livelihoods												
Apiculture	*Yes*	N/A	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	Yes
	Harvest plans, sustainable harvest trainings		Sustainable honey harvesting programme, *Harvest plans, sustainable harvest trainings*		Link harvesters and SHGs						Festival, *Honeybee network; links with women and harvesters*	Trainings
Agriculture	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Exposure Visit	Training
NTFP collection and value addition	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
			Sustainable honey harvesting programme									Training
Marketing	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Link harvesters and SHGs							
Farmer Producer Organisation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ecotourism	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Training

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
MGNERGA	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	Yes	Yes
					Documenting, Gram Sabha discussion					Liasing with government activities	Exposure visits	Documentation
Forest Rights Act Interventions												
Filing claims	Yes	Yes	Yes	N/A	Yes	N/A	N/A	N/A	Yes	N/A	Yes	Yes
	Tenure and access rights claims, *Community rights over forest resource*	Tenure and access rights claims, *Community rights over forest resource*	Management Plans		Village Gram Sabha discussions, *Democratic decision making*				Government recognition of tenure and access rights claims		Exposure Visit	Training
Mapping	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Mapping										
Others	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	N/A	*Yes*	Yes
						Joint patrolling			Support for Government officials		*Share findings*	Capacity Building
Capacity Building												
Strengthening village institutions	N/A	N/A	Yes	N/A	Yes	N/A	N/A	N/A	Yes	N/A	N/A	Yes
			Village Rules		Awareness raising				Village Gram Sabha meetings			Training
Village Savings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
									Documentation			
Gender Equality	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	*Yes*	N/A	Yes
					Increasing women and youth participation					*Collective action at different levels*		Mobilisation, *Workshops*
Others	N/A	N/A	*Yes*	*N/A*	*Yes*	N/A	N/A	N/A	N/A	N/A	N/A	Yes
			Microplans		*Democratic decision making*							Training, *Village institutions*
Awareness Building												
Awareness building	N/A	*Yes*	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	Yes
		Maps			Increase stakeholder consensus						Exposure Visit, *Outreach*	Awareness programmes

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Conservation education	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes
										Interventions at different scales and different levels	Exposure Visit	Training
Advocacy												
Policy comments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*	*Yes*	*Yes*	*Yes*
									Liaising with the government	*Interventions at different levels*	*Networking*	*Capacity building*
Lobbying/Protesting	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	Yes	Yes	*Yes*	*Yes*
					Inclusion in decision-making bodies				Inclusion in government approved bodies, *Liaising with the government*	Participation at different scales and different levels, *Interventions at different levels*	*Networking*	*Capacity building*
Liaising with Government Departments	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	Yes	N/A	Yes	Yes
			Co-creation of plans					Opening communication channels between community and government	Co-creation of plans, *Trainings for government officials*		Inclusion of government representatives in village events	Trainings
Communication												
Traditional Knowledge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Events to build trust with the community	Capacity building
Trust building	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Events to build trust with the community	
Watershed Management												
Watershed management												
Research												
Research	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A
			Scientific research						*Increasing government recognition*			

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Health												
Nutrition and medicine connected to biodiversity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Events to build trust with the community	Capacity building, *Food sovereignty*
Climate Change												
Networking												
Networking	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	Yes	Yes	Yes	N/A
					Gender equality				Negotiating with the government	Connecting different scales and levels	Networking	
Funding												

Appendix C3: NGO 3 - Design principles

	NGO 3											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interview Answers	Harvesting rights left to community to decide as activities are carried out in groups that decide roles etc. among themselves. NGO doesn't want to involve itself and disrupt this activity.	Mapping. GPS training	Harvest Protocol	Benefit sharing left to community to decide as activities are carried out by family units so the NGO doesn't want to interfere in family structures.	Community volunteers, permissions from community institutions etc. as well as youth and women empoerment.	Short and long term monitoring by community volunteers. But it is difficult to ensure accountability all the time.	Conservation Agreements	NGO tries to intervene or facilitate but mostly doesn't want to interfere with the communities' governance.	Forest Rights Act claims	Producer company is made out of individual production units in various villages	Exposure visits, Community Foundations	Model villages, Trainings, etc.
Biodiversity Management												
Nurseries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	*Yes*
											Income generation, *Exposure Visits*	*Capacity Building*
Seed conservation	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Seed festivals	
Tree planting	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Ecological restoration	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Agroforestry	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Management Plans	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
			Management Plans									
Managing human wildlife conflict	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Exposure Visits	*Building awareness and capacity of animal presence*

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Conservation agreements	N/A	N/A	Yes	N/A	N/A	N/A	Yes	N/A	N/A	N/A	Yes	N/A
			Set of rules				Sanctioning, *Conservation Agreement*				Provision of community needs	
Working on coffee estates	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Monitoring	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*Yes*
						Trainings, Community monitors			*Sharing information with Forest Department*			*Trainings*
Community monitors/Stewards	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	N/A	N/A	*Yes*
						Community monitors			Sharing information with Forest Department			*Trainings*
Alternate Livelihoods												
Apiculture	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
			Sustainable Harvest Protocol				*Conservation Agreement*				*Awareness building; Networking*	*Trainings*
Agriculture	*N/A*	*Yes*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
		Mapping	*Farm plans*								*Networking*	*Trainings*
NTFP collection and value addition	N/A	N/A	Yes	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	N/A	Yes
			Harvest Protocol		*Women's empowerment*							Trainings
Marketing	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	*Yes*	*Yes*
				Cooperative sale						Interventions at different levels	*Fixed platform for farmers*	*Trainings*
Farmer Producer Organisation	N/A	N/A	N/A	Yes	*Yes*	N/A	N/A	N/A	N/A	Yes	Yes	Yes
				Profit sharing between shareholders	*Inclusion of women in the member lists*					Interventions at different levels	Exposure visits, *Fixed platform for farmers*	Trainings
MGNERGA	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*	*N/A*
									Liasing with Governemtn officials		*Employment generation*	

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Other skills	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
			Training in sustainable harvests		*Capacity Building of women and youth*						*Networking*	*Skill development*
Forest Rights Act Interventions												
Filing claims	*Yes*	*Yes*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	Yes	*Yes*
	Filing claims under FRA	*Filing claims under FRA*			*Strenghten Gram Sabha*				*Filing claims under FRA*	*Filing claims under FRA at different levels*	Model villages	*Trainings*
Mapping	N/A	Yes	N/A	N/A	Yes	N/A	N/A	N/A	*Yes*	*N/A*	*Yes*	*Yes*
		Mapping. GPS training			Participatory mapping				*Sharing information with Forest Department*		*Model method of mapping*	*Trainings*
Others	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	Yes	Yes
			Management Plans						*Liasing with Governemtn officials*	*Interventions at different levels*	Model villages, *Outreach*	Capacity building
Capacity Building												
Strengthening village institutions	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	*Yes*	Yes	*Yes*	Yes
					Increased participation in village institutions, *Gram Sabhas formed*				*Training for Government officials*	Interventions at different levels	*Fixed platform to discuss FRA*	Group foundation, *Trainings*
Gender Equality	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	Yes
					Women empowerment						Outreach	Trainings
Others	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
					Increased participation of youth							*Capacity Building*
Awareness Building												
Awareness building	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Outreach	
Conservation education	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Sharing information	*Teaching students*
Citizen Science	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
					Increase participation of local citizens							

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Advocacy												
Liaising with Government Departments	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*	*Yes*
			Management Plans						*Liasing with Governemtn officials*		*Exposure Visits*	*Capacity Building*
Communication												
Traditional Knowledge	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	Yes
					Women empowerment						Outreach	Trainings, *Funding*
Trust building	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Sharing information, *Transparent outreach*	
Watershed Management												
Watershed management	N/A	Yes	Yes	N/A	N/A	*Yes*	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*	*Yes*
		Mapping. GPS training	Water Security Plans			*Community monitors*			*Liasing with Governemtn officials*		*Exposure Visits*	*Trainings*
Research												
Research	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*	N/A
			Harvest Protocol								*Participatory methods*	
Health												
Nutrition and medicine connected to biodiversity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Employment generation	
Improving health	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Improving community health, *Health benefits*	*Trainings*
Climate Change												
Disaster management	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
												Capacity Building
Climate action	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Networking												
Networking	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	*Yes*
										Interventions at different levels	*Networking*	*Capacity Building*

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Funding												
Providing funds	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*	Yes	*Yes*
										Interventions at different levels	Improving community health, *Funding*	*Capacity Building*
Fund raising	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

Appendix C4: NGO 4 - Design principles

	NGO 4											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	Gives advice, Forest Rights Act	Mapping	Sustainable harvest trainings	Facilitate but being decided by the community and their leaders	Programmes to build women's capacity but collection and marketing mostly by men	Capacity building	Give advice, but ultimately left to the leaders	Facilitate discussions between community and Forest Department	FRA		Exposure visit	Trainings, involving the community
Biodiversity Management												
General	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Seed conservation	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Invasive species management	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Agroforestry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	*Yes*
											Income generation as incentive to conserve	*Trainings*
Management Plans	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
			Resource Management Plan									
Managing human wildlife conflict	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Income generation as incentive to conserve	
Corridor conservation	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Monitoring	N/A	N/A	Yes	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A
			Monitoring data			Monitoring						
Community monitors/Stewards	N/A	*Yes*	Yes	N/A	*Yes*	Yes	N/A	N/A	N/A	N/A	N/A	Yes
		Participatory resource mapping	Capacity Building, *Harvest protocol*		*Participatory resource mapping*	Capacity Building, *Community monitoring*						Trainings

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Alternate Livelihoods												
Apiculture	N/A	N/A	Yes	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	Yes
			Trainings		Awareness programme						Income generation as incentive to conserve	Capacity Building
Agriculture	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*	Yes	*Yes*
										Farmer Producer Company	Income generation an incentive to conserve	*Trainings*
NTFP collection and value addition	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
			Trainings, *Sustainable harvests*								Income generation an incentive to conserve	Capacity Building, *Provision of equipment*
Marketing	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	*Yes*
				Co-operative society						*Multi-level marketing company*	*Income generation an incentive to conserve*	*Trainings*
Farmer Producer Organisation	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	*Yes*
										Farmer Producer Company	*Income generation an incentive to conserve*	*Trainings*
Lantana furniture	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*	Yes	Yes
										Networking	Income generation an incentive to conserve	Capacity Building
Other skills	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Income generation an incentive to conserve	*Capacity Building*
Forest Rights Act Interventions												
Filing claims	Yes	Yes	Yes	N/A	N/A	Yes	N/A	N/A	Yes	N/A	Yes	Yes
	Forest Rights Acts claims	Forest Rights Acts claims	Management Rights			Monitoring Rights			Forest Rights Acts claims *and awareness*		Income generation an incentive to conserve, *Exposure visits*	Capacity Building, *Workshops*
Mapping	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Mapping										

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Others	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
			Forest Management Plans									
Capacity Building												
Strengthening village institutions	Yes	Yes	Yes	N/A	N/A	Yes	N/A	N/A	Yes	N/A	Yes	Yes
	Forest Rights Acts claims	Forest Rights Acts claims	Management Rights			Monitoring Rights			Forest Rights Acts claims		Income generation an incentive to conserve	Capacity Building
Gender Equality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Capacity Building
Others	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Share information with the community	Capacity Building
Awareness Building												
Awareness building	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Outreach	
Conservation education	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Outreach	*Capacity Building*
Citizen Science	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
					Citizen monitoring	*Citizen monitoring*						
Advocacy												
Policy comments	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Liaising with Government Departments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A
								Mediating between community and government				

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Communication												
Traditional Knowledge	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
			Share information with the community								Share information with the community	Capacity Building
Watershed Management												
Watershed management												
Research												
Research	N/A	N/A	Yes	N/A	*Yes*	Yes	N/A	N/A	N/A	N/A	*Yes*	Yes
			Monitoring data, *Management Plans*		*Co-management meetings*	Capacity building					*Outreach*	Capacity Building
Health												
Climate Change												
Climate action	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Income generation an incentive to conserve	*Trainings*
Networking												
Networking												
Funding												
Providing funds	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Societal/Financial benefits	*Scholarships for education*

Appendix C5: NGO 5 - Design principles

	NGO 5											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	Yes Forest Rights Act (was not implemented due to lack of funding)	Yes Resource maps	Yes Education and awareness raising (communities have own value systems and usually don't overharvest unless there is external pressure)	No NGO does not want to interfere in existing systems	Yes Tribal Development Council formation	No Too difficult to ensure accountability	No Left to the community to decide	No Indirectly through alcoholism/man animal conflict	Yes Attempt to implement laws like Farmers' Rights Act and Forest Rights Act	Yes Farmer Producer Company	Yes Interest generation and awareness building activities	Yes Trainings, education
Biodiversity Management												
Nurseries	*N/A*	*N/A*	*N/A*	*N/A*	*Yes* *Participation of women and youth*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes* *Awareness building*	*Yes* *Capacity building*
Seed conservation	*N/A*	*N/A*	*N/A*	*N/A*	*Yes* *Participation of youth*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes* *Networking*	*Yes* *Trainings*
Tree planting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes Awareness building	*Yes* *Capacity building*
Ecological restoration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes Awareness building	N/A
Agroforestry	*N/A*	*N/A*	*N/A*	*Yes* *Meeting with experts and stakeholders*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes* *Provision of materials/support*	*Yes* *Capacity building*

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Management Plans	*N/A*	*Yes*	*Yes*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*Yes*
		Mapping	*Biodiversity managemnet plans*		*Participatory mapping excercies*				*Declaration of biodiversity heritage sites*			*Trainings*
Managing human wildlife conflict	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Capacity building
Alternate Livelihoods												
Apiculture	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Exposure visits	*Trainings*
Agriculture	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Awareness building, *Exposure visits, interest generation*	Capacity building, *Trainings*
NTFP collection and value addition	N/A	N/A	Yes	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	Yes	Yes
			Sustainable harvesting methods		*Increased participation of women*						Awareness building, *Exposure visits, interest generation*	Capacity building, *Trainings*
Marketing	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	Yes	Yes
					Increased participation of women						Awareness building, *Exposure visits, interest generation*	Capacity building, *Trainings*
Farmer Producer Organisation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes
										Interventions at different levels	Awareness building, *Exposure visits, interest generation*	Capacity building, *Trainings*
Ecotourism	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Awareness building, Income generation	

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Other skills	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Provision of materials/support	*Trainings*
Forest Rights Act Interventions												
Filing claims*	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
	Awareness building	Awareness building							Awareness building			
Mapping	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Resource maps										
Capacity Building												
Strengthening village institutions	N/A	*Yes*	*Yes*	N/A	Yes	N/A	N/A	N/A	*Yes*	Yes	*Yes*	Yes
		Mapping	*Biodiversity managemnet plans*		Increased confidence and participation of women, *Gram Sabha meetings*				*Declaration of biodiversity heritage sites*	Interventions at different levels	*Festivals*	Capacity building, Trainings
Gender Equality	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes
					Increased confidence and participation of women							Capacity building, Trainings
Others	N/A	N/A	*Yes*	N/A	*Yes*	N/A	N/A	N/A	N/A	*Yes*	N/A	Yes
			Assist community management		*Increased participation of youth*					*Intervention at different levels*		Capacity building, Trainings
Awareness Building												
Awareness building	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes
										Interventions at different levels	Awareness building	Capacity building, Trainings
Conservation education	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Sharing data with other stakeholders	*Education, Training*

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Citizen Science	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Sharing data with other stakeholders	*Education, Training*
Advocacy												
Liaising with Government Departments	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Selection of participants in planning							
Communication												
Traditional Knowledge	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Providing space for community expression	*Capacity building*
Watershed Management												
Watershed management	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
			Water Management Plans		*Village Water Committees formed*	*Monitoring and auditing of water resources*						*Village Water Committees formed*
Research												
Research	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
			Action plan		*Formation and support to village insitutions. Sensitisation*						*Awareness building*	
Health												
Nutrition and medicine connected to biodiversity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
												Trainings
Improving health	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Medical camps	
Alternate energy/materials	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
					Empower women							

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Climate Change												
Disaster management	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes
										Intervention at different levels	Awareness building, *Sharing data with other stakeholders*	*Trainings*
Climate action	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
			Action plan								*Exposure visits*	*Capacity building*
Networking												
Networking	N/A	N/A	N/A	*Yes*	Yes	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A
				Building institutions	Increased particiation of students					*Buildng institutions*		
Funding												

Appendix C6: NGO 6 - Design principles

	NGO 6											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	No	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
			Advise communities	Unable to establish	Outreach activities to encourage participation	Moral accountability		Mediation	Liasing with government officials	Multilayered networks	Outreach	Education programmes
Biodiversity Management												
Nurseries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seed conservation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tree planting	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
												Workshops
Ecological restoration	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
		Fencing										*Workshops*
Invasive species management	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Conservation agreements	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
			Agreements		*Consultations*							*Trainings*
Working on coffee estates	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			MoUs									
Managing human wildlife conflict	N/A	*Yes*	N/A	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes
		Fencing			Increase participation, *Include multiple stakeholders*	Community operated warning lights			Liasing with government officials	Multilayered networks	Model landcapes	Community takes the lead

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Wildlife Conservation	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	Yes	N/A	Yes	*Yes*
					Consultations				Liasing with government officials		Share information, *Awareness raising*	*Capacity building*
Corridor conservation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	Yes	N/A
									Liasing with government officials		Share information, *Awareness raising*	
Monitoring	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
			Conflict mitigation strategies									
Community monitors/Stewards	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	Yes	Yes	Yes
						Community operated warning lights				Multilayered networks	Model landcapes	Community takes the lead
Alternate Livelihoods												
Forest Rights Act Interventions												
Capacity Building												
Strengthening village institutions	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	*Yes*	Yes	*Yes*
					Meetings and interactions					*Network expansion*	Awareness raising, *Formal and infomal interactions*	*Trainings*
Gender Equality	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*Yes*
					Increased women participation					*Network expansion*		*Trainings*
Others	*N/A*	*Yes*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	*Yes*
		GIS Trainings			*Increased women participation*					*Network expansion*	*Formal and infomal interactions*	*Trainings*

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Awareness Building												
Awareness building	N/A	N/A	Yes	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	Yes	*Yes*
			Awareness raising		*Registration and sensitisation days*						Awareness raising, *Outreach*	*Worshops*
Conservation education	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	*Yes*	Yes
					Increased participation						*Outreach*	Education programmes
Citizen Science	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	N/A
					Increase participation						Outreach	
Advocacy												
Liaising with Government Departments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	Yes	*Yes*
									Rapid response teams, *Liasing with government officials*		Share information	*Trainings*
Communication												
Trust building	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	*Yes*
					Meetings and interactions					*Network expansion*	*Formal and infomal interactions*	*Trainings*
Watershed Management												
Watershed management												
Research												
Research	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Identify measures based on studies									
Health												
Alternate energy/materials	*N/A*	*Yes*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
		Funding for fencing			*Consultations*						*Provide essential infrastructure*	

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Climate Change												
Climate action	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Networking												
Networking	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*	*Yes*
										Networking	*Information sharing*	*Trainings*
Funding												
Providing funds	*N/A*	*Yes*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
		Funding for fencing			*Affordable fencing that more people can afford*							

Appendix C7: NGO 7 - Design principles

	NGO 7											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
		Demarcation of plots	Protocols		Encourage community to participate, trainings	Protocols, supervisors	No such situation until now	Facilitation, well knit groups, small closed community that can handle it themselves)	Recognition by Forest Department	Difficult to scale up	Trustbuilding, expansion to other villages	Trainings
Biodiversity Management												
Nurseries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Capacity building
Seed conservation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Capacity building
Tree planting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ecological restoration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*	Yes
											Build trust in the model	Capacity building, *Increase communities' self confidence*
Invasive species management	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agroforestry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Management Plans	N/A	Yes	Yes	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A
		Demarcation of plots	Protocols			Monitoring						
Managing human	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

wildlife conflict												
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
Corridor conservation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*	*Yes*
											Build trust in the model	*Increase communities' self confidence*
Monitoring	N/A	N/A	Yes	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A
			Protocols			Monitoring						
Community monitors/Stewards	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
												Training
Alternate Livelihoods												
Apiculture	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
					Increased participation of women							*Training*
Ecotourism	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Income as conservation incentive	*Training*
Lantana furniture	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes
					Increased participation of women							Trainings
Other skills	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes
					Increased participation of youth							Trainings
Forest Rights Act Interventions												
Capacity Building												
Strengthening village institutions	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*
												Community leadership
Village Savings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
												Community bank accounts, *Training*

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Gender Equality	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes
					Increased participation of women							Trainings
Others	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes
					Increased participation of youth							Trainings
Awareness Building												
Awareness building	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
					Increased participation of children							
Conservation education	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Advocacy												
Liaising with Government Departments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
									Recognition by Forest Department			
Communication												
Traditional Knowledge	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	N/A	*Yes*
					Increased participation of youth							*Training*
Trust building	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	Yes	N/A
					Increased participation of communities						Trust-building	
Watershed Management												
Watershed management	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Research												
Research	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Health												
Alternate energy/materials	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	Yes	N/A
					Increased participation of communities						Trust-building	
Climate Change												
Networking												
Networking	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A
										Networking		
Funding												
Providing funds	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	*Yes*	Yes
					Income as conservation incentive						*Income as conservation incentive*	Capacity building
Fund raising	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	*Yes*	N/A
					Income as conservation incentive						*Income as conservation incentive*	

Appendix C8: NGO 8 - Design principles

	NGO 8											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	No	Yes	Yes	No	Yes	No	No	No	No	Yes	Yes	Yes
	Too early	Providing fencing	Connecting community to knowledge resources	Left to community	Attempting through indigenous nurseries	Monitoring by NGO themselves	Too early to say	Tooo early to say	Work in clearly established spaces	Networkings	Indigenous nurseries, livelihood generation	Trainings
Biodiversity Management												
Nurseries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Exposure visits	Technical and monetary support
Seed conservation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Exposure visits	Technical and monetary support
Tree planting	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
		Fencing									Community interactions	
Ecological restoration	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
		Fencing									Community interactions	
Invasive species management	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Boundary clearing										
Management Plans	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Mapping										
Working on coffee estates	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Long term engagements	
Managing human wildlife conflict	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Boundary clearing										

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Monitoring	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A
						Monitoring by NGO themselves						
Alternate Livelihoods												
Other skills	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes
					Increase participation of youth							Capacity building
Forest Rights Act Interventions												
Capacity Building												
Others	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	*Yes*	Yes
					Increase participation of youth						*Awareness building*	Capacity building, *Technical and monetary support*
Awareness Building												
Awareness building	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Awareness building	*Technical and monetary support*
Conservation education	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Awareness building	*Technical and monetary support*
Advocacy												
Liaising with Government Departments	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
		Mapping							MoU with forest department			

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Communication												
Traditional Knowledge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Awareness building	Capacity building, *Technical and monetary support*
Watershed Management												
Watershed management	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Research												
Research	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
		Fencing									Community interactions	
Health												
Nutrition and medicine connected to biodiversity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Awareness building	*Technical and monetary support*
Climate Change												
Disaster management	N/A	N/A	Yes	N/A	Yes	Yes	N/A	N/A	N/A	N/A	Yes	N/A
			Advice		Participation of farmers	Monitoring by NGO themselves					Awareness building	
Networking												
Networking	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	Yes	N/A
					Greater community engagement					Networking	Greater community engagement	
Funding												
Providing funds	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	*Yes*
											Provide funding, *Awareness building*	*Technical and monetary support*
Fund raising	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C9: NGO 9 - Design principles

	NGO 9											
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	No	No	Yes	No	Yes	No	No	No	No	No	Yes	Yes
	Everyone goes into their own property and collects whatever possible	Most land is privately own with .5% Forest land	Will teach sustainable harvest methods*	Currently all activities take place on an individual places and it will be some time before collective action is possible	Attempting through outreach but it will take time*	Difficult on private lands	Too early to finalise rules and regulations	Everything is private land	Not necessary as everything is already private lands	Currently all activities take place on an individual places and it will be some time before collective action is possible	Previous successful conservation activities have taken place	Conservation education and trainings
Biodiversity Management												
Tree planting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Awareness building, income generation	
Ecological restoration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Awareness building, income generation	
Conservation agreements	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Compensation to plantation owners	
Wildlife Conservation	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
		Fencing									Awareness building, inclusion of local communities	Trainings

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Monitoring	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	*Yes*
						Monitoring by NGO, Community monitors					Awareness building, income generation, *Inclusion of community members*	*Trainings*
Community monitors/Stewards	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
						Community monitors					*Inclusion of community members*	*Trainings*
Alternate Livelihoods												
Apiculture	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Awareness building, income generation	Trainings
Agriculture	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Awareness building, income generation	*Trainings*
NTFP collection and value addition*	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
			Frame rules and regulations								Awareness building, income generation	Trainings
Marketing*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Awareness building, income generation	
Ecotourism	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Awareness building, income generation	Trainings
Other skills	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Awareness building, income generation	Trainings

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Forest Rights Act Interventions												
Capacity Building												
Others	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	N/A	N/A	N/A	Yes	Yes
					Increased participation						Awareness building, *income generation*	Trainings
Awareness Building												
Awareness building	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Awareness building	
Conservation education	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	*Yes*
					Increased participation of students, parents						Awareness building	*Trainings*
Citizen Science	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	*Yes*
					Increased participation of students, parents						Awareness building	*Trainings*
Advocacy												
Liaising with Government Departments*	N/A	N/A	N/A	N/A	N/A	*Yes*	N/A	N/A	*Yes*	N/A	Yes	N/A
						Joint patrolling with forest department			*Joint patrolling with forest department*		Awareness building, income generation	
Communication												
Watershed Management												
Watershed management												

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Research												
Research	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Awareness building, inclusion of local communities	
Health												
Improving health	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
											Improving health of local communities	
Climate Change												
Networking												
Networking	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*	*N/A*
										Sharing of information at different levels		
Funding												
Fund raising	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

Appendix C10: NGO 10 - Design principles

NGO 10												
Programme	**Harvesting rights**	**Boundaries**	**Local appropriation rules**	**Proportional Benefits**	**Participation**	**Accountable monitors**	**Graduated sanctions**	**Conflict-resolution**	**External recognition**	**Nested enterprises**	**Social capital**	**Appropriate leadership**
General												
Interview Answers	No	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes
	Too early for harvest, outmigration complicates rights	Boundaries are already fairly well known, NGO doesn't want to interfere, and needs techincal expertise	Informal rule setting in conservation agreements, formal rules through management plans	Outmigration complicates rights, so NGO doesn't want to interfere	Community involvement low	Monitoring done by the NGO but there is low community involvement	Community involvement low	NGO doesn't want to interfere	No willingness from community but working on it	Trying but it is difficult to scale up	Capacity building/livelihood training	Capacity building trainings
Biodiversity Management												
General	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tree planting	N/A	Yes	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
		Fencing				Monitoring done by the NGO but there is low community involvement					Income generation	
Ecological restoration	N/A	Yes	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
		Fencing				Monitoring done by the NGO but there is low community involvement					Income generation	
Agroforestry	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Income generation	
Management Plans	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	Yes	Yes	N/A	N/A
			Formal rules						Government approval	Interventions at different levels		

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Conservation agreements	N/A	N/A	Yes	*Yes*	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Informal rules	*Incentive and benefits to the community for conservation*	Outreach							
Wildlife Conservation	N/A	Yes	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
		Fencing				Monitoring done by the NGO but there is low community involvement					Income generation	
Corridor conservation	N/A	Yes	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
		Fencing				Monitoring done by the NGO but there is low community involvement					Income generation	
Alternate Livelihoods												
Apiculture	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Income generation	
Agriculture	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Income generation	
NTFP collection and value addition	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Income generation	Capacity building trainings
Marketing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Income generation	Capacity building trainings
Ecotourism	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Income generation	Capacity building
Other skills	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes
											Income generation	Capacity building

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Payment for Ecosystem services	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Income generation	
Forest Rights Act Interventions												
Capacity Building												
Gender Equality	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Income generation	*Capacity building*
Others	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*Yes*
											Income generation	*Capacity building*
Awareness Building												
Awareness building	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Awareness raising	
Conservation education	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Awareness raising	
Advocacy												
Policy comments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
									Policy changes to reflect the model			
Communication												
Watershed Management												
Research												
Research	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Programme	Harvesting rights	Boundaries	Local appropriation rules	Proportional Benefits	Participation	Accountable monitors	Graduated sanctions	Conflict-resolution	External recognition	Nested enterprises	Social capital	Appropriate leadership
Health												
Nutrition and medicine connected to biodiversity	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*Yes*	*N/A*
											Income generation	
Climate Change												
Networking												
Funding												
Fund raising	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A