

**Applying political ecology to ecosystem services:  
Operationalizing an alternative approach to ecosystem services  
research using an empirical case study in Odisha, India**



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**M.Sc Thesis in Environmental Systems Analysis (ESA-80436)  
Wageningen, June 2012**

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## Preface

This thesis was conducted as a ‘joint venture’ between the Environmental Systems Analysis (ESA) Group and the Technology and Agrarian Development Group of Wageningen University (TAD). Both groups have taken responsibility for 50% of the supervision and financing of this thesis, although it officially will be carrying the course number of the former group.

The process leading to the culmination in the form of this thesis is long. In fact, I started thinking seriously about developing an alternative approach to ecosystem services research during the course work of my MSc studies. In the courses we learned about ecosystem services, but I started to dislike the concept more and more because the emphasis was too much on economic valuation. I got the impression that more importance was being given to the price tags put on nature’s services rather than on the value generation process itself. To give these impressions a place, I started with a *Capita Selecta* course with TAD under supervision of dr. Kees Jansen in November 2010. For this course I wrote an essay on how political ecology can contribute to the field of environmental systems analysis and especially ecosystem services research.

After completion, in January 2011, I left for my internship with the Political Ecology of Forest Ecosystem Services and Poverty Alleviation (PEFESPA) project at ATREE, in Bangalore India. Working for this project was a great opportunity for me, as the objectives of it very much overlapped with my search for alternative approaches to studying nature’s contribution to human societies. Since my internship took place in the very initial phase of the project I contributed to the operationalization and conceptualization of the project while mostly working in the ATREE and Vasundhara offices.

After the writing of my internship report I went back to India in October 2011 to rejoin the project for my thesis; this time with the aim to put my ideas in real practice and conduct political ecology field work in a small forest-dependent community in India. We agreed that the field work for my thesis would function as an intra-management regime case study for the PEFESPA team, which enabled me to work in a semi-independent way, while also contributing to the team. I stayed in the field for about 3.5 months.

With this thesis, I have found an application for my feeling that something is lacking in ecosystem services research and I hope that it will prove useful for those who are practicing ecosystem services research. In the end, my thesis was written for this audience.

On my long and winding road leading to this final thesis report I was supported by an incredible number of generous, bright, and inspiring people. First of all I would like to express my heartfelt gratitude to my two supervisors Karen Fortuin and Todd Crane, who from the start of my thesis have been very supportive of the unconventional ideas I had for my thesis work. All throughout the process, both supervisors have unceasingly provided me with very useful feedback which enabled the materialization of my ideas into a robust thesis. I especially want to thank Todd for guiding me in making sure that my findings were firmly empirically-grounded (fostering the anthropologist in me) and Karen for proactively steering me to tailor my rather unconventional thesis to the intended audience of environmental systems analysts.

In India I also have received great support from a large assembly of different people. First of all, I want to express my earnest gratitude to the project leaders, dr. Sharachchandra Lélé (of ATREE) and dr. Springate-Baginski (of the University of East Anglia) for their help in operationalizing my work and their invaluable enlightening inputs. Mr. Lélé also patiently taught me and my field team colleagues the intricacies of political ecology fieldwork, while he stayed with us in the field for almost a week. Also, I want to thank the other PEFESPA researchers who have been very helpful at different times during my fieldwork: Debal Deb, Prasad Dash, Madhu Sarin.

A special thanks goes out to my colleagues in the field Hemanta, Bishwarupa and Lakshmi. During the writing process I have stayed in contact with Lakshmi, who helped me greatly with the interpretation of the field observations. Without the staff of the Vasundhara field office in Ranpur I would not have been able to successfully complete my fieldwork. Uncountable thanks go out to Nilamani (who made sure I got a suitable translator and helped me with all the registration and paperwork to be dealt with), Madhava (who also made sure his family in Basantpur hosted me and provided me with three delicious local meals a day!), Ashok and Bagyalaxmi (who freed a lot of time to translate my informed consent letter in Odia). My dependable translator Sudarsan Pradhan (Titu) turned out to be the best translator I could have wished for: thanks a lot!

Besides the help from the Ranpur field team of Vasundhara (the implementing organization for the PEFESPA project) I also got a lot of support from the research team in Bhubaneswar: a special thanks to the director Giri Rao and researchers Tushar Dash, Soumen Sarangi and Sudhansu Deo.

Back in Wageningen, a lot of my close friends helped me with the writing process and the completing phase of my thesis. I want to especially thank Lian for her invaluable feedback which greatly improved my presentation the night before I had to present, and Matthijs, Wilma, and Rishi for reviewing my work and their great input in the final editing of my thesis report. An extra word of thanks goes out to my mother, father and two sisters who came to my final presentation.

I want to thank Esther Carmen of the University of East Anglia for allowing me to use her format for operationalizing the household survey. In the very last phase of my research, prof. Leemans of the ESA chair group helped me greatly with an in-depth review and discussion of my report looking both at the written English and structure of the text, and the robustness, logics and consistency of the arguments in it: I would like to thank him very much for this. My final word of thanks should go out to all the people of Teen Mauza, who truly accepted me as a temporary inhabitant of their community: thanks for making me feel at home in a place so different from my usual habitat.

Roan Lakerveld, Wageningen, 4<sup>th</sup> June, 2012

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## Executive summary

Recently, the concept of ecosystem services and its underlying literature have become dominant in the conceptualization of the link between human societies and ecosystems. The Millennium Ecosystem Assessment (MA) of 2005 reinforced this leading position of ecosystem services, and its definition of the latter as “the benefits people obtain from ecosystems” has become adopted as the working definition of the concept. The typology developed in the MA, subdividing ecosystem services in provisioning, regulating and cultural services, based on a range of supporting services, has become a standard in ecosystem services research.

In this thesis, I focus on the criticism that the model has received from political economists, political ecologists and sociologists. This critique argues that the importance of social and power relations in ecosystem service distribution has been disregarded in ecosystem services research. More specifically, the aggregated conceptualization of human wellbeing in ecosystem services research precludes studying the actual distribution of benefits. Also, ecosystem services research disregards the effects of (ecosystem management) trade-offs between ecosystem services on groups of ecosystem users. The aggregation of human wellbeing, the critique argues, also has consequences for the explicit social goal of ecosystem services research of reconciling biodiversity conservation and poverty alleviation. It rules out the empirical study of who is benefiting from which ecosystem services and how exactly ecosystems contribute to poverty alleviation.

This thesis presents an alternative approach to ecosystem services research aimed at the disaggregation of human society and wellbeing. As a mode of inquiry I used the political ecology approach of Ribot and Peluso’s *Theory of Access*. This theory and analytical framework is geared to empirically analysing the distribution of benefits of natural resources in terms of access mechanisms and its embeddedness in social and power relations. The objective of this thesis is threefold: 1) to empirically study how ecosystem services and dis-services are distributed among ecosystem user groups in a community in India and if and how this distribution is embedded in concrete social and power relations, 2) to develop, operationalize and pilot an alternative approach based on the *Theory of Access* that can contribute to ecosystem services research, 3) to use the pilot to identify avenues for follow-up research that can further strengthen the alternative approach and contribute to ecosystem services research in general.

The case study was conducted in Teen Mauza community in the Nayagarh district of Odisha, eastern India. This community is comprised of three villages, which together are actively protecting a patch of forest of 250 acres since 2002. The ecosystem services that I studied from this forest patch are NTFPs, bamboo provision, fodder provision for goat grazing, cultural services; the dis-service under study is that of crop damage by wild boar and monkeys.

For the carrying out of the case study I lived with the community in the village of Basantpur for 2.5 months. The methodology of the study was loosely based on Walters and Vayda’s (2009) highly empirical research methodology of *event ecology* and was organised using a two-step approach. The first step was geared at answering how-questions on the distribution of the ecosystem services and dis-services by making use of focus group meetings, a stratified household survey (40%-sampling rate), informal (ethnographic) interviews with key informants, and participant observation. The second step was focused on answering the why-questions pertaining to why the ecosystem services in Teen Mauza are distributed as observed, looking at access mechanisms, and social and power relations. At this stage of my research I mostly used participant observation, which enabled an inductive mode of inquiry. In this way, I formulated hypotheses as to the role of various potential access mechanisms and then through eliminative inference derived the most plausible of these hypotheses.



The case study shows that ecosystem services do not equally benefit all the community members of Teen Mauza. In fact, for all of the services under study, some community members are *not at all able to benefit*, for example households with labour shortages in terms of fodder provision for goat grazing, and Hindu-caste women in terms of most of the cultural services. When looking at the distribution of ecosystem services among those user groups actually benefiting from them, the differences are substantial. This is especially the case for NTFPs: an average tribal household collects about 38 times more tubers than an average non-tribal household in Teen Mauza. Also, crop damage is very unequally distributed. This all points out that Teen Mauza is a heterogeneous community that cannot just be aggregated into one indicator for human wellbeing.

In Teen Mauza, some access mechanisms stand out as the most important distributional factors: cultural identity (gender and ethnicity), labour availability, knowledge, and geography. When looking at how these mechanisms relate to social and power relations, there is only one significant power relation: that between urban-based absentee goat-owner and entrepreneur Ajay Das and the community members. Ajay, who has his land in Teen Mauza, has a lot more power than the latter, as he can hire permanent herders for his 235 goats and thus is not affected by labour shortage. Also, he is the only one in the community who is able to fence off his fields to protect them against crop damage. Apart from this one power relation, the distribution of all other ecosystem services can be explained better in terms of social relations and informal social control. My case study shows that the *Theory of Access* provides a good conceptual framework for empirically studying the distribution of ecosystem services and illuminating this distribution in terms of social and power relations.

The story of the existing power differences between Ajay and the community members and the fact that Ajay both has better access to the fodder provisioning service and is able to protect himself better against the dis-service of crop damage has important implications. Although in the ecosystem services literature, ecosystem services are seen as neutral, this example shows that ecosystem services in some cases may actually be reinforcing existing inequities. This evokes a further question: is it true that only a select few of already well-off people are able to significantly benefit from ecosystem services, while the poorest who really need these benefits are mostly left out?

Pertaining to trade-offs, it was not feasible for me to biophysically assess, for instance, the important, on-going trade-off between NTFP provision and grazing in Teen Mauza. The complete absence in the literature of longitudinal studies on this topic, and on trade-offs between different ecosystems in general, provides an avenue for future research.

The empirical political ecology approach of this thesis reveals and makes researchable some important aspects of the people-nature interface that usually are overlooked: dis-services, distributional effects, trade-offs, social relations that determine access mechanisms, and actual links between ecosystem services and the poor. This asks for an increased reflexivity among ecosystem services researchers on the influence of the methodology used on the outcomes of the inquiry. This might also lead to a critical evaluation of the assumptions currently underlying ecosystem services research, pertaining to the aggregation of human wellbeing, and ecosystem services as variables that do not have relations with one another.

This thesis takes the first steps in operationalizing an *empirical* alternative approach to the study of ecosystem services on the basis of the *Theory of Access* which can aid the current field of research in overcoming the critical challenge it is facing: bridging biodiversity conservation, and poverty alleviation and development.

# 1. Introduction

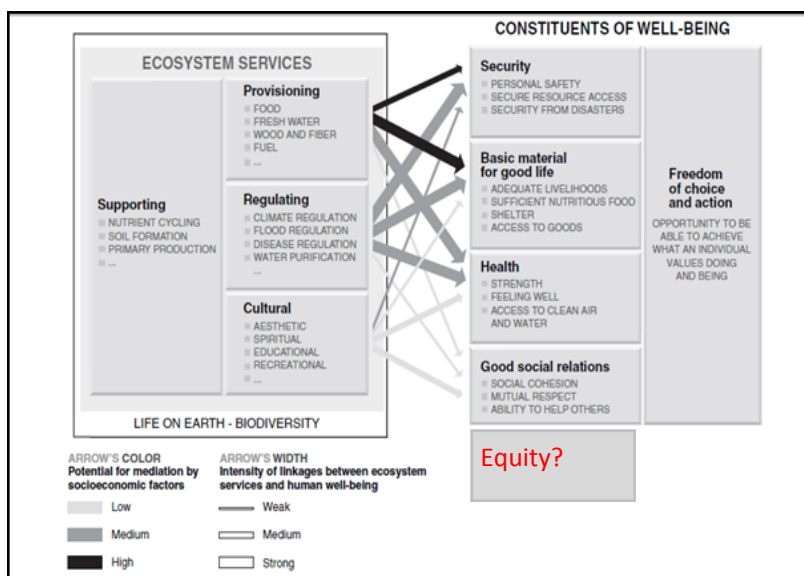
The concept of ecosystem services and its underlying literature, have recently become leading in epitomizing the link between human societies and natural ecosystems (Norgaard 2010). This MSc thesis embodies an alternative approach to the study of ecosystem services: it assesses whether political ecology, currently completely disconnected from this field of science, can be an adequate approach to address some of the shortcomings of ecosystem services research.

The reputed Millennium Ecosystem Assessment (MA 2003: 2) defined ecosystem services as “the benefits people obtain from nature”. The MA focused on the state of the world’s ecosystems, the drivers of ecosystem change and the exploration of the linkages between ecosystems and human wellbeing (MA 2003). The assessment addressed how changes to these ecosystems impact human wellbeing and points out that “ecosystems provide a variety of benefits to people including provisioning, regulating, cultural and supporting services” (MA 2003: 8). The MA developed a dynamic and comprehensive system-approach, which operationalizes the world’s ecosystems as a stock of natural capital providing a flow of ecosystem services to human societies on a variety of geographical and temporal scales (MA 2005, Norgaard 2010).

The MA has become a landmark of natural resource management and nature conservation, as it put conservation back on the agenda by making the concept of ecosystem services accessible to the greater public, including international policy makers and NGOs (Carpenter *et al.* 2009, Gómez-Baggethun *et al.* 2010). In the last decennium it has become a blueprint concept of the relationship between society and nature in environmental policy communities around the globe (Norgaard 2010).

In short, the MA framework has been instrumental in making explicit the larger system of nature’s contribution to society, in showing that conservation can be good for economic development, and in shedding light on how, as Norgaard (2010: 1220) puts it, “ecological and sociological phenomena happen on multiple scales and over different time periods that also match with the scalars of different institutions”.

Figure 1.1: Graphical representation of the contribution of ecosystems to human wellbeing in the MA (adapted from MA 2003, equity box added by author of this thesis)



## 1.1 Problem Statement

The fact that the concept of ecosystem services has become so widely acknowledged and is being applied around the globe, conceals the substantial criticism it has received from other scientific communities. I will accommodate some of these criticisms in an alternative approach to studying ecosystem services.

The critiques I will address stem from a sociological and political ecology perspective. These critiques mainly are aimed at the aggregated conceptualization of human wellbeing as derived from ecosystems<sup>1</sup>. Showing that an increase in the provision of ecosystem services leads to more human wellbeing at large, critics argue, ignores the social and power relations that are inherent to access to and control over natural resources (Daw *et al.* 2011). These relations between human actors play a pivotal role in the distribution of ecosystem services. Daw *et al.* (2011: 373) point out that “[i]ncreasing flows of an ES thus may have little effect on the wellbeing of the poor if they do not have access mechanisms to benefit from it”. Also, they argue, the reverse holds: if access improves, people’s wellbeing may improve, while ecosystem provision remains the same.

Research on ecosystem services and natural resources use, especially in forest ecosystems, has been and continues to be largely conducted and discussed in two completely disconnected scientific communities (Springate-Baginski 2010). The first community, mostly comprised of ecologists and economists, is mostly involved in developing (conceptual) models and methodology to identify, map, quantify and subsequently value ecosystem services. The second community, mostly formed by political economists, political ecologists and sociologists is engaged in more empirical analytical work. Their focus is on property rights, institutions, and governance mechanisms pertaining to the links between ecosystems and their users, with a special focus on the wellbeing of the poor (Springate-Baginski 2010).

The result of this disjoint is that the first community has mostly neglected the critical importance of social and power relations as a determining factor in ecosystem service distribution. At the same time, the second community tends to lack ecological rigor, (the often criticized absence of ecology in political ecology (e.g. Walker 2005)) and has difficulties with conceptualizing the multi-scalar effect of ecosystem services on stakeholders, from the local to the global (Springate-Baginski 2010). The first community mostly studies ecosystems and the services they provide as a given and as something which can be assessed independently from human society. The second community mostly studies these as socially embedded phenomena which cannot be separated from their societal context. There is a need to bring these two communities together to engender inter-disciplinary cooperation, combining the quantitative and positivistic, with the more qualitative and constructivistic, and the conceptual with the more empirical.

As Lélé *et al.* (forthcoming) point out, ecosystem service research is at the moment mostly being used in the form of a prescriptive decision-making model, aimed at reconciling development and biodiversity conservation. They argue that the pitfall of such an approach is that it has the propensity to become too much like advocacy, since the conclusion of ‘we must conserve biodiversity’ is already known from the start. In this light, the valuation would only

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<sup>1</sup> Following Daw *et al.* (2011), I argue that any assessment of human wellbeing that does not pay attention to subgroups implicitly or explicitly aggregates people.

function as a tool to come to a value that is high enough to conclude that conservation is necessary (Lélé *et al.* forthcoming). Hence, the authors conclude that ecosystem services research should be geared toward becoming a much more *descriptive* rather than *prescriptive analytical* framework that can provide us with actual *understanding* of the plurality of ways in which people relate to ecosystems (Lélé *et al.* forthcoming). In other words, the task of an ecosystem services analyst should be “‘to analyse’, not to aggregate and give *the answer*” (ibid.: 31). This analytical turn could aid in building an *empirical* understanding of the social-ecological systems we form a part of, and the links between ecosystems and human wellbeing and poverty alleviation.

## 1.2 Conceptualization of this thesis

In this thesis, I elucidate how political ecology thinking can be instrumental in empirically scrutinizing and refining the relationship between society and ecosystems as conceptualized by ecosystem services research. As Daw *et al.* (2011: 371) point out, by only quantifying benefits for humankind as a whole, the MA and most ecosystem services researchers gloss over existing “distributional patterns of benefits between groups defined, for example, by geographical area, socioeconomic status, gender, ethnicity or time (in terms of current and future generations)”. The problem of ecosystem services research is that it is too aggregated. It quantifies ‘the benefits people obtain from ecosystems’, without proposing empirical methods to study which people are actually *able to benefit* and more importantly which people are not. Empirical, explorative and inductive analyses are needed to enhance the understanding of the actuality of the distribution of ecosystem services and how this is influenced by social relations.

The MA highlights the importance of ecosystem services for poverty alleviation: “Slowing or reversing the degradation of ecosystem services will contribute significantly to the achievement of many of the MDGs [Millennium Development Goals]” (ibid., MA 2005: 61). The assessment points out that there is a need to better understand the link between ecosystems and poverty alleviation to inform management decisions (MA 2005). While the MA highlights that equity is an indispensable value when it comes to poverty alleviation, equity was not operationalized as an aspect of human wellbeing (see Figure 1.1) (Lélé *et al.* forthcoming).

I argue that to make the contribution of ecosystem services to poverty alleviation researchable, it is needed to explicitly disaggregate the benefits people obtain from ecosystems (see Daw *et al.* (2011)). Some ecosystem services researchers (e.g. Van Beukering *et al.* 2003) have disaggregated ecosystem services beneficiaries to some extent (i.e. in local community, local and national government and global citizens). However, a higher level of disaggregation is needed to enable studying if and how ecosystems relate to poverty alleviation and equity. This thesis emphasizes that in order to empirically study if and how people differentially derive benefits from (and are differentially negatively affected by) ecosystems, more sociological rigor is needed in ecosystem services research. It is through studying the social relationships and institutions in which ecosystem service use is embedded, that we can improve our understanding of the multi-faceted interface between people and ecosystems.

Another issue that could be studied when disaggregating ecosystem-derived human wellbeing are trade-offs between ecosystem services, which often also imply trade-offs between groups of ecosystem users. Obviously, an ecosystem cannot provide maximum levels of all ecosystem services at a time, which means that choices related to ecosystem use and management have to be made (see Lélé *et al.* forthcoming). This further implies that the decision of which bundle of ecosystem services will be optimized, implies a trade-off between different user groups. While the overall benefits to humankind may remain the same, a different mix of ecosystem

services due to changes in ecosystem management may imply a shift in the flow of benefits to different ecosystem users. An analysis of these dynamics of ecosystem services is currently missing from the ecosystem services literature (Lélé *et al.* forthcoming).

In this thesis, I disaggregate ecosystem-derived human wellbeing and resituate ecosystem service use in its sociological context by making use of political ecologists Ribot and Peluso's (2003) *Theory of Access* (the central analytical framework of this thesis). This framework is geared at the empirical analysis of people's access to natural resources as the *ability to benefit* from these. It has been widely used in the social sciences literature on the political ecology of natural resource management. This thesis, however, is a first attempt to apply the *Theory of Access* to the study of ecosystem services. Hence, it represents a first step in bridging the gap between ecosystem services research on the one and political ecology on the other side. The alternative approach will be operationalized and empirically tested in a case study in Odisha, India.

### 1.3 Objectives and Research questions

The objective of this thesis is threefold: 1) to empirically study how ecosystem services and dis-services<sup>2</sup> are distributed among ecosystem user groups in a community in India and if and how this distribution is embedded in concrete social and power relations, 2) to develop, operationalize and pilot an alternative approach based on the *Theory of Access* that can contribute to ecosystem services research, 3) to use the pilot to identify avenues for follow-up research that can further strengthen the alternative approach and contribute to ecosystem services research in general.

To operationalize my research and research questions I made use of two working hypotheses: (1) different subgroups of people benefit differently from a given ecosystem service, or suffer differentially from a particular ecosystem dis-service (operationalized in this study as the disaggregation of ecosystem-derived human wellbeing), (2) the ability to make use of ecosystem services is embedded in concrete social and power relations. To empirically scrutinize these two hypotheses, I conducted an anthropological case study in Odisha, India.

The first research question of this thesis is a 'how-question', aimed at an empirical description of how the ecosystem services under study are being distributed in the community: *How are the forest ecosystem services of non-timber forest products (NTFP), bamboo, and fodder provision and cultural services; and the dis-service of crop damage by wild boar and monkeys being distributed among different user groups of people in the community?* The second research question is aimed at assessing how the alternative analytical framework informs the question *why* the distribution of services and dis-services occurs as observed: *How does the Theory of Access illuminate the observed distribution of ecosystem services and dis-services in terms of embeddedness in social and power relations in the community?*

### 1.4 Purpose of the case study

The two hypotheses geared at disaggregation, which I used to operationalize my research questions functioned as working hypotheses. In the field I further adapted and specified these through doing my research in an inductive way. Before going to India, I did not have an analytical framework or pre-set methodology (although the standard structure used for my thesis report suggests this). I only discovered that the Theory of Access would be an adequate analytical framework while looking at my observations and findings after returning from the field. The

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<sup>2</sup> In this thesis I also study the impact of dis-services, or *the costs that ecosystems inflict on people* (see section 2.5 of the theoretical framework for a further elaboration on this issue).

theory emerged from the fieldwork rather than that I used the case study to test a pre-decided theory.

In order to contribute to ecosystem services research, suggesting methodological alternatives alone would not be enough. To elucidate the contribution of the alternative approach, I needed to *empirically show* the added value of it through a proof of principle. The case study was thus used as a means of methodology-development and -testing at the same time<sup>3</sup>.

The purpose of the case study, in the first place, was to develop an alternative methodology for empirically studying the distribution of ecosystems and to link this to social and power relations. In other words, it was aimed at analytical generalization. Its main purpose was thus not the generation of data on and generalization of insights into the intricacies of the relation between rural (Indian) communities and the forest.

### 1.5 The case study: Teen Mauza community

The State of Odisha borders the Bay of Bengal on India's east coast and is tugged in between West Bengal in the north and Andhra Pradesh in the south. My research site, Teen Mauza community (consisting of the villages of Akhupadar, Basantpur and Lakhapada, literally meaning 'Three Villages'), is situated in Ranpur block of Nayagarh district, at approximately 80 km. from Odisha's capital Bhubaneswar (see Figure 1.1). Teen Mauza is a diverse community: Akhupadar is an almost completely tribal village with people of the Kondha tribe, Basantpur is a General Caste farming village, and Lakhapada is a mixed village with a large community of landless labourers.

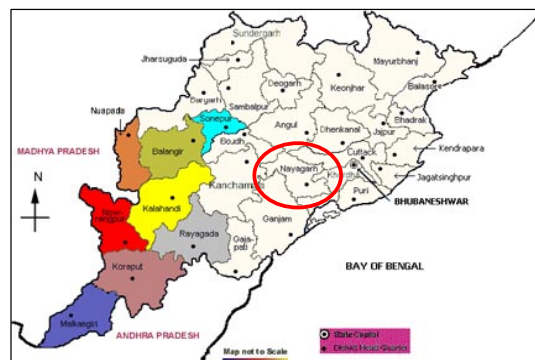


Figure 1.1: District map of Orissa  
(Source: <http://www.orissa.net/body.php?page=nayagarh>)

In Teen Mauza and the surrounding Ranpur area, informal, customary community forest management (CFM) plays an important role in governing everyday people-forest interactions, as many communities since the late 1970's have reclaimed the forests they customarily owned. However, as most of the forests officially are classified as Reserve Forests, the Forest Department remains the *de jure* owner. The latter can in principle refuse to grant local people access to the forest, but has been quietly on the background in the Ranpur area, and generally has seen CFM as an effective forest protection strategy which does not cost any governmental effort (pers. com. G. Rao, November 2011). Hence, although the Forest Department has not officially acknowledged the community forests, it has not actively countered the communities' reappropriation of the Revenue Forests either.

<sup>3</sup> This is characteristic for inductive research (see Waddington 2004).



Considering Community Forest Management (CFM), Odisha is a rather unique place, as within its boundaries it has the highest density of informal, self-initiated forest management systems anywhere in the world (Conroy *et al.* 2002). Estimates of active CFM committees in the state, range between 5000 (Sarin *et al.* 2003) and 12,000 (pers. com. G. Rao, November 2011). The high incidence of these types of customary management is related to the relatively large percentage of (forest-dependent) tribal people in the state of Odisha (22.1 % of the people in Odisha are registered as tribal according to the 2001 census) (Census of India 2001). The forest forms a crucial element of the lifeworlds of the villagers, as it provides them with a substantial part of their subsistence and livelihood: fuel wood for daily cooking, bamboo for house construction and basket-making, fodder provisioning for the grazing of animals and NTFPs such as tubers, fruits and mushrooms.

## 1.6 Outline of this thesis

In the theoretical framework (chapter 2) that follows, I situate the political ecology approach I will make use of in this thesis in the wider field of political ecology and the traditions of political economy from which it emerged in the 1980's. This is followed by an outline of the heterogeneous body of current political ecology literature and a placing of the approach used in this thesis within this diverse field. In last three sections of the framework I operationalize the *Theory of Access*, the notion of trade-offs and the concept of ecosystems dis-services.

In the methodology chapter (chapter 3) I explain how my research was operationalized and what approach and which methods I used for this. This section also discusses the system boundaries, methodological and ethical considerations, limitations of the research, and data analysis. The results chapter (chapter 4) has been divided in six sections: the first section presents background information on Teen Mauza and its community forest protection system; the other five sections each embody a detailed description of one of the four ecosystem services under study and the dis-service of crop damage focused on 1) the distribution of the service or dis-service among different user groups in Teen Mauza, and 2) an analysis of how this distribution is embedded in social and power relations by focusing on the role of access mechanisms. Each section ends with a short synopsis of the major findings and how they relate to the research questions.

The discussion is presented in chapter 5. This chapter assesses the results in an integrated way and relates these to the thesis' objectives. Furthermore the wider implications of my findings are discussed in this chapter, pertaining to: 1) applying the *Theory of Access* to intra-community research, 2) how my research can be followed up and extrapolated to elucidate the role of trade-offs between ecosystems in Teen Mauza and in ecosystem services research in general, 3) how my findings inform the important notions of ecosystem management and participation, and 4) what the implications of my findings are for the relationship between ecosystem services and the development of the poor, pointing out how further research is needed to bring to light how ecosystem services in some cases may reinforce existing inequities. The last part argues that in order to address these issues, more open-ended empirical analysis is required in ecosystem services research. The conclusion is presented in chapter 6.

## 2. Theoretical framework

In this section of my thesis, I aim to place the political ecology approach that I operationalize in this thesis in the context of the historical development of the wider scientific field from which it emerged. This will aid the reader who is familiar with political economy and not so much with political ecology, to better understand what the core characteristics are of the Marxist political ecology school<sup>4</sup>. Most of the approaches in the field of contemporary political ecology still have elements of early political economy. Getting an understanding of the origins of political ecology will thus aid a lot in understanding the broad field we call political ecology today.

After having described the origins of political ecology and its emergence from the political economy traditions, I portray the heterogeneous and diverse field of political ecology as it is today. Following this, I place the approach that I use in my case study in this wider scientific field of political ecology to make explicit where my approach is situated on the continuum from positivism to constructivism. This is followed by an operationalization of the *Theory of Access*.

As mode of empirical inquiry, political ecology is not only sociological. In fact, political ecology theory posits that the shaping forces of the biophysical and sociological context on the human-nature relationship are essentially inter-related and cannot be separated. Quoting Aletta Biersack: “Only if pursued as both an environmental science *and* a complex social-cum-human “science” of nature it will be possible to achieve the utopian collaboration imagined at the outset (...) on the terrain of culture/power/history/nature” (Biersack 2006: 29). In order to come to an understanding of the actuality of the distribution of ecosystem services in a certain locality, it is also required to understand its biophysical context. As a method of the *empirical* inquiry of the multi-faceted human-nature interface, political ecology research can thus integrate the sociological and biophysical aspects of ecosystem services research. I will discuss how through the ecologically-based study of trade-offs between ecosystem services, empirical political ecology research can also contribute to a more accurate understanding of the biophysical context of ecosystem services. The last part of the theoretical framework is dedicated to the notion of dis-services, its origins, definition and the reasons for including the concept in this study.

### 2.1 Political economy in anthropology and the emergence of political ecology

The use of political economy in anthropology can be characterised as an analysis aimed at understanding the impacts of structures and processes of power on anthropological subjects embedded in larger historical, political, economic movements (Roseberry 1988). Although many anthropologists have framed their work as falling under “political economy”, the term never has had a singular definition and as a field of science it has been very heterogeneous (Roseberry 1988).

In its earlier, Marxist, form political economy, especially as practiced by American anthropologists (Roseberry, 1988), was concerned with the “problems created by Western economic and political dominance of lesser developed societies, (...) [and] of class identity and struggle (...)” (Firth 1972). These two concerns have formed the basis of two different communities within early anthropological political economy.

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<sup>4</sup> The Theory of Access could be considered to be part of this school.



The first was mainly focused on the penetration of capitalism (also in its earlier colonial forms) into distant locales of the developing world and how it changed these locales from use-oriented, subsistence-based to exchange-oriented commodity-based societies. Watts (1983) emphasizes that these transitions entailed new market-based vulnerabilities for rural societies, as the new modes of production undermined prior safety nets of the moral economy (which was largely based on reciprocity and neighbour-care). Therefore, with the expansion of colonialism, famines had to be seen as “socially produced” rather than being “natural, drought-induced disasters” (Watts 1983: xxiii).

This orientation was mostly popularized by Wallerstein in his adaptation of Frank’s (1967) earlier work on the causal relationship between ‘development’ in the “North” and the underdevelopment in the “South” it required (also coined as *dependency theory*). Wallerstein’s (1974) *world system theory*, in which he theorized (and empirically showed through historical analysis) how the world functions as a global class system with the owners of the means production in the (first world) core and the main body of workers in the (third-world) periphery, became a characterizing element of much political economic anthropological work (Biersack 2006). Both Frank’s and Wallerstein’s ‘world systems’ were extremely static, one-sided and deterministic, as Frank argued that underdevelopment as he operationalized it would be there as long as capitalism would be the dominant political paradigm, while Wallerstein explained “structures and elements in the system (...) in terms of the functions they served for the development of the core or the maintenance of the system as a whole” (Roseberry 1988: 167).

Wallerstein and Frank were opposed by a group of other anthropological political economists in the 1970’s, who were also Marxist in their orientation, but argued for a more nuanced and less deterministic look on the matter (Roseberry 1988). These scholars were more invested in the second concern of “class identity and struggle” (see above). Their critiques were focused on underdevelopment, but studied it with a focus on modes of production<sup>5</sup> and class formation. This they did on the basis of a differentiated understanding of capitalism, by focussing on the “articulation” between capitalist and non-capitalist modes of production (ibid.). These inquiries did not exclusively concern the developing world, as for instance women in the ‘developed world’ and their role in reproduction (both fertility and subsistence related), rather than production, also came to be seen as largely falling under non-capitalist modes of (re)production (ibid.).

The term political ecology was first coined by the influential political economist Wolf in the beginning of the 1980’s (Biersack 2006). Wolf’s (1982) book *Europe and the People without History* has become to be seen as a work that successfully synthesizes the body of preceding political economy work and has been used by a variety of political economy researchers. Using an approach grounded in the cultural history tradition of the 1950’s, Wolf rejects both the “unilateral imposition of capitalism upon anthropological subjects and the illusory search for cultural authenticity” (Roseberry 1988: 173).

In spirit with Wolf’s contribution to the field, political economy can be summarized as essentially an historical analysis of the dialectic between the local and the global (both constituted by their respective histories, economies, and power structures), leading to a diverse multiplicity of local-global articulations, and the unique imprint each of these have on the people embedded in them (Roseberry 1988). In fact, Roseberry (1988: 173) argues that in the complexity of the

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<sup>5</sup> Production here is used in a Marxian connotation including both forces and relations of production, and viewing production as the basis of social organization, determining distribution, circulation and consumption (Howard and King 1975).

modern world “the logical and historical separation of “the local” and “the larger context” (...) is no longer tenable. These notions have formed the basis of political ecology when it arose as an emerging field from the wider body of political economy in the 1980’s.

### *The emergence and development of political ecology as a field of science*

In the process of edging out political ecology (a conjuncture of ecological concerns and “a broadly defined political economy” (Blaikie and Brookfield 1987: 17)) as a separate field in the 1980’s, geographers (such as Watts, Blaikie, Brookfield) took a leading role (Biersack 2006). In the main body of political economic theory, nature had been side-lined as mere context, or just an input or outcome of capital and production, but the geographers who took the lead in the early development of political ecology as a scientific field convincingly argued that *nature shapes modes of production* (Marsden *et al.* 1996) and that political economy should thus be seen as “a dialectic between society and land-based resources” (Blaikie and Brookfield 1987: 17).

One of the prime early contributors was Piers Blaikie, who wrote his seminal work *The political Economy of Soil Erosion in Developing Countries* in 1985. This book provided geographers and anthropological political economists with a novel framework that grounds environmental science in the power relations of the political economy and thereby formed one of the first conceptual frameworks of a political ecology approach (Biersack 2006). The approach could be classified as neo-Marxist, and therefore Blaikie still firmly stands with one leg on political economic ground.

Central to the book is the study of “the ways in which the development of capitalism affects peasantries and pastoralists, and thereby the ways in which they use the environment” (Blaikie 1985: 119). In his conceptual framework, Blaikie defines capitalism in Marxian terms, as he argues that soil degradation is an outcome of surplus extraction from peasants. These peasants in turn are forced to overexploit the productive capacity of their land, which leads to depletion of fertility and erosion.

In addition to this political economic analysis of food production, Blaikie also provided insights into the politics of framing. He points out that whether soil degradation will be framed as a problem depends on if people involved have enough access to political power (Blaikie, 1985: 2). Blaikie (1985: 155) convincingly shows that soil erosion often is “both a result of and a contributory cause of inequality” and that not only the causes of soil degradation, but also the framing of it as a problem, is deeply rooted in inequality.

Blaikie’s work remains a very useful conceptual framework for approaching political ecology up to today. However, political ecology as a field has moved much farther beyond the materialism and structuralism of his approach (see Biersack 2006). Most importantly, while Blaikie (1985) did pay some attention to problem framing and epistemology he did not really take up the issue of reality as posterior, rather than prior to discourse (Biersack 2006), an issue that became very prominent in later postmodernists and poststructuralist political ecology work (see e.g. the work of Escobar).

The contributions to the anthropology and geography traditions of postmodernism and poststructuralism, have radically changed the connotation of Watt’s (2000: 257) rather political economical definition of political ecology in terms of “the complex relations between nature and society” with special attention to “forms of access and control over resources and their implications for environmental health and sustainable livelihoods”. As Thomas-Slaytor and Rocheleau (1995) elucidated, political access and control of resources is closely tied to how cultural classifications and differences such as ethnicity, race, class and gender are being framed.

Hence, Biersack (2006) importantly points out, this means that political ecology should not only be materialistic (studying distribution of natural resources among predefined subcategories of resource users), but also symbolic (studying how subcategories of resource users themselves are actively being constructed and contested, as essentially discursive products). “Differences are contingent, constructed, profoundly political products” (Biersack 2006: 23), and therefore extra attention should be given to locales in which these differences are played out in a very unlevel playing field (with those in power dominating both the material and the discourse).

## 2.2 Placing my thesis in the political ecology field

Summarizing the aforesaid, just like political economy, political ecology research cannot be characterized by a singular definition or methodology: it consists of a wide set of approaches and therefore cannot be easily generalized or typified (Walters and Vayda 2009). Nevertheless, most political ecology research shares an inquiry into the multi-level contextual causes of environmental change. Its focus is on the dialectical human-nature interface, linking a localized historical analysis of changes in the environment to the wider operating (global) political economy of natural resource use. In other words, political ecology research transforms neutral explanations of environmental change by placing them in the context of real social and political (unequal) relationships. It pays special attention to how these environmental changes may be “used to reinforce or challenge those relationships” (Bryant *et al.* 1993: 103). Political ecology has upheld the predisposition to privilege the rights of the poor and marginalized over those of the political elite (Walker 2007) it inherited from the radical Marxist political economy movements of the 1970s.

Scholars have come up with typologies that interpret political ecology approaches as somewhere within the spectrum between political/materialist and symbolic (Robbins 2006), and realist/empirical and generalist (Walters and Vayda 2009). The first spectrum pertains to differences between approaches that inquire into the question of “who exercises power over, and whose interests are being served by, the ways human beings are relating to the environment” and those approaches concerned with symbolic notions of the environment, or “the cultural construction of the environment and its meaning” (e.g. the work of Arturo Escobar) (Robbins 2006: 171). The second spectrum differentiates those approaches which are ground in empirical study and are more ethnographic in nature from those that link environmental change to more generalistic and unified causal chains such as global capitalism and globalization (Walters and Vayda 2009).

My approach to political ecology is closer to the political/materialist end of the first and the realist/empirical end of the second spectrum. In fact, the *Theory of Access* is firmly rooted in the political economy of Blaikie’s work and forms a part of the wider neo-Marxists field of political ecology. In my view, such an approach will be more applicable to ecosystem services research, which, I argue, is a positivistic and materialist scientific approach. Hence, any approach which is too much on the symbolic side of the debate will be hard to commensurate with the existing body of ecosystem services research.

## 2.3 Theory of Access: access to the benefits of ecosystems

To analyse and conceptualize the point of access to the benefits of ecosystems, I propose political ecologists Jesse C. Ribot and Nancy Lee Peluso’s *Theory of Access* (2003), as an analytical approach that is able to pull ecosystem services, or the benefits people obtain from nature, back in

the social reality in which they are embedded. I will also be drawing from Ribot's (1998) earlier conceptual work on this topic and his work together with Larson (2007), in which they apply the *Theory of Access* to people-forest relations. This will enable the answering of important and thus far neglected questions such as who is benefiting and who is not and why?

The 'Theory of Access' is aimed at empirically studying how access to natural resources is differentiated among different actors in society. By using a lens of access to and control over natural resources, this approach will enable me to analyse how ecosystem-derived benefits and human wellbeing are distributed among user groups, and how this distribution is being shaped by the power relations in which these people-nature relationships are embedded.

The 'Theory of Access' was presented as a more comprehensive alternative to the conventional focus on *de jure* property rights and entitlements in rights-based approaches, arguing that rights are just one part of all the social relationships that shape access to resources and that the power "to act on those rights depends on the negotiation of a number of complementary access mechanisms" (Larson and Ribot 2007). Ownership of a piece of land, for instance, might not be sufficient to enjoy the benefits of that land, as the absence of other access mechanisms such as access to labour, access to technology, or access to markets, prevents the owner from really obtaining benefits. Hence, Ribot (1998: 312, emphasis added) conceptualizes access as "*the ability to obtain or make use of benefits*" pertaining to natural resources. The *Theory of Access* thus guides the empirical study of who actually benefits to which extent from a certain natural resource and "through which processes they are able to do so" (Ibid.: 154). Using this working definition of access, I argue that we only need to substitute the word 'benefits' for 'ecosystem services' to tailor the approach to analysing the distribution of ecosystem-derived human wellbeing.

Ribot and Larson (2007: 192) conceptualize access as a 'bundle of powers' (which themselves are embedded within 'webs of powers' surrounding natural resources (Ribot and Peluso 2003)) operationalized as "a number of complementary access mechanisms" that can be negotiated and appropriated by actors to gain access to the benefits of a particular natural resource. Ribot and Peluso (2003: 161) propose a three-tiered approach to analysing this 'bundle of powers': 1) identification and mapping of the "flow of the particular benefit of interest", 2) "identifying the mechanisms by which different actors involved gain, control, and maintain the benefit flow and its distribution", 3) "an analysis of the power relations underlying the mechanisms of access involved in instances where benefits are derived".

Remarkably, the first step described by the researchers is a conventional first step in ES research projects too (again it suffices to substitute the word 'benefits' for 'ecosystem services'). Flows of ecosystem services are a popular topic of study in ES research, usually with the aim of documenting and mapping which ES provide 'benefits to society' at which temporal and spatial scales (in some cases with the help of GIS software) (e.g. Nelson *et al.* 2009, Troy and Wilson 2006).

By also making use of the last two tiers of Ribot and Peluso's (2003) theory, ecosystem services research would be able to study why some people have the ability to benefit from ecosystem services and, more importantly, why some have not. The mechanisms deployed to gain, maintain and control access to natural resources mentioned in the second tier refer to the "means, processes and relations" that grant people access to natural resources. The researchers emphasize that all mechanisms of access are "forms of social relations", stressing that access is often obtained through others who control it (Ribot and Peluso 2003: 172, Larson and Ribot 2007). Ribot and Peluso (2003: 160) also stress that these "social relations (...) emerge from cooperation and conflict over benefits (...) within particular political-economic moments". Social

relations and access-negotiation processes are thus seen as embedded in power relations surrounding the political economy of the natural resource, the analysis of which is proposed in the third tier.

In order to make the bundles of powers that determine the flow and distribution of benefits of a natural resource researchable, the authors propose disaggregating them into their constituent strands of access mechanisms (Ribot 1998). People are *able to benefit* from a particular resource by negotiating access through a variety of different strands of access mechanisms (such as access to technology, capital, markets, labour, authority), or by monopolising and controlling one or two access strands. Actors can also combine efforts to expand their bundles of powers in order to maintain or control access (Ribot and Peluso 2003).

Ribot and Peluso (2003) draw from Blaikie's (1985) more Marxist work on political ecology. Some of Blaikie's ideas on access mechanisms, which he coined 'access qualifications' are very insightful and can be valuable in the operationalization of the theoretical framework of the *Theory of Access*. As Blaikie (1985: 110) pointed out in his explanatory scheme for land-use and political economy, an individual household's choice of income opportunities depends on its "social, political and economic" circumstances. In his model all locally available income opportunities are in principle available to all households, but each of these income opportunities "carries with it a set of [...] access qualifications". He then argues that the income opportunities with the least stringent access qualifications are those who are least paid, such as daily wage labour, and those who require an elaborate set of access qualifications will be most lucrative (Blaikie 1985). Every household is managing a set of assets. Some of these assets are purchased, some of them are what Blaikie (1985: 110) coined "windfall assets", for instance distance to the nearest market, and some of these assets are inherited (membership of certain social and ethnic groups). Dependent on the characteristics of the income opportunity, a certain combination or bundle of these assets is needed as access qualifications (Blaikie 1985). Ribot and Peluso (2003: 165) build on this notion in their *Theory of Access*, as they "extend Blaikie's discussion by exploring how technology, capital, markets, knowledge, authority, social identities, and social relations can shape or influence access".

In short, the *Theory of Access* provides a clear framework for situating and empirically studying the flows and distribution of benefits of natural resources (or ecosystem services) in the social and power relations in which they are embedded; the social reality.

### *Differences between my thesis work and the Theory of Access*

The main difference between my focus and that of Ribot and Peluso (2003) regards access and distribution of benefits is probably a difference in scale. While my focus is mostly on the distribution of ecosystem services *within* a small community of forest protecting people, Ribot and Peluso (2003) have geared their power analysis toward studying 'webs' of power in the whole political economy (all along the value chain) of natural resources. The *Theory of Access*, while straightforwardly contributing to the study of social relationships that shape access in the whole political ecology, does not seem to accommodate access-shaping factors that have to do less with outward negotiation in the power play of the political economy and more with actors' personal (competence-based) ability to access certain resources and cultural differences. While theorizing ethnic identity as a means of negotiating access (for instance by claiming to be 'indigenous') (Ribot and Peluso 2003), the authors do not conceptualize the more personal aspects of cultural or ethnic identity. In short, the subtle, intra-community aspects of access are not taken into consideration by the authors. In my thesis I will use the *Theory of Access* as a

general conceptual framework. In doing so, I will adapt the crucial concepts of access mechanisms and power relations to the context of resource use in Teen Mauza. In this way, this thesis also contributes to accommodating *distribution within communities* in the theory.

## 2.4 Trade-offs between ecosystem services and ecosystem users

It is well known that every ecosystem state represents a specific set of trade-offs and synergies between ecosystem services. However, interaction between ecosystem services and the social and ecological forces that shape them, as a subject has largely remained unaddressed in the main body of ecosystem services literature (Raudsepp-Hearne *et al.* 2010, Lélé *et al.* forthcoming). Bennet *et al.* (2009: 1395) state regarding this point that “most science implicitly uses as a simplifying assumption the notion that ecosystem services do not have significant and variable relationships with one another” and that, “[t]hus, we do not know much about when to expect trade-offs or synergies, the mechanisms that cause them, or how to minimize trade-offs and enhance synergies”. The general body of ecosystem services literature has overemphasized win-win scenarios, showing all the ecosystem services that ecosystems supply to human society, while glossing over all the other scenarios that generate both winners and losers (Lélé *et al.* forthcoming). Most of the literature that does touch upon trade-offs, does so only by pointing out the obvious trade-offs between, for instance, (agricultural) provisioning services and regulating services such as soil conservation and water regulation (e.g. Nelson *et al.* 2009). Recently, the topic of trade-offs between ecosystem services has gained some more attention within ecosystem services research and different authors have come up with typologies of trade-offs (Bennett *et al.* 2009), empirical studies of less obvious trade-offs (Swallow *et al.* 2009) and a study and clustering of ecosystem services into synergistic bundles at specific social-ecological subsystems in a wider landscape (Raudsepp-Hearne *et al.* 2010).

In the last decades, sociologists, political economists and political ecologists (the second scientific community described in the problem statement of this thesis) involved in forest management, however, have done a lot of work on trade-offs between different modes of ecosystem management and the conflicts in which these are embedded (Lélé *et al.* forthcoming). The work of this scientific community, has however not spilled-over to the ecosystem services literature which could draw important lessons from it.

Based on this second body of literature, Lélé *et al.* (forthcoming), based on Lélé (1994), represent trade-offs between ecosystem services in a tropical forest in a trade-off table (Table 1.1). The table shows that every ecosystem state or land-use type provides a specific bundle of ecosystem services and that the level of provisioning of the individual ecosystem services differs per bundle. Fundamental to this dynamic are the trade-offs and synergies between ecosystem services embodied by every land-use scenario. It is very important to note that there are no scenarios that provide only synergies, and that it is inescapable that every bundle of ecosystem services provided by any land-use type includes trade-offs (Lélé *et al.* forthcoming).

Table 2.1: Trade-offs between different benefits (and beneficiaries) of forest ecosystem services under different land-use scenarios (adapted from Lélé 1994)

		FOREST PRODUCT, SERVICE or BENEFIT									
		Timber	Fuel-wood	Leaf manure	Fodder	"Minor" Produce	Hydro-logical regulation	Soil Conser-vation	Bio-diversity	Carbon seques-tered	
LAND USE TYPE	"Forest"	Dense "natural" forest	0	++	++	0	+++	+++	+++	+++	+++
		Dense lopped forest	+	+++	+++	+	++	++?	++	++	++
		Open tree savanna	0	++	++	++	+	+?	++	+	+
		Pure grassland	0	0	0	+++	0	+++?	++	+	+
		Timber plantation	+++	+	+	0	0	+/-?	+	+	+++
	"Non-forest"	Coffee plantation	+	+	+	0	0	++?	++?	+	++
		Terraced paddy	0	0	0	++	0	+?	+?	?	0
		Slope cultivation	0	0	0	+	0	0?	-	?	0
		Barren land	0	0	0	0	0	-	-	0	0

Notes: 1. Source: Lélé (1994).  
2. Plus signs indicate extent of positive benefits, minus signs indicate negative impacts. The signs represent physical impacts, and so are comparable only within a column, not across columns  
3. Colours indicate different groups of beneficiaries: red=local, blue=regional, green=global.  
4. Question marks indicate significant uncertainty about nature of impact]

When farther examining the table it becomes clear that, while every land-use type in the table seems to determine what trade-offs and synergies are possible, it is important to realize that these land-use types in fact represent management and use regimes that are decided on by people. Thus, deciding on the composition of the bundle of ecosystem services that one desires to derive from an ecosystem implies deciding on the state of an ecosystem, represented as land-use type in the table, and vice-versa. For instance, if one would decide to optimize the fodder provision of a tropical forest, other services, such as timber, fuel wood and leaf manure provision will be compromised, shifting the ecosystem more towards the "pure grassland" land-use type, as shown in the table. Raudsepp-Hearne *et al.*'s (2010) research shows that current bundles of ecosystems provided by the ecosystems used in their study are outcomes of past ecological and social dynamics. They argue that "social-ecological systems produce ecosystem services in complex patterns in accordance with where humans desire specific ecosystem services, where it is possible to produce them, and how they will interact" (Raudsepp-Hearne *et al.*: 5245).

As in many cases, especially in the case of forest- (or more generally ecosystem-) dependent societies, certain livelihood specialization groups prefer certain specific ecosystem services. Trade-offs between ecosystem services in these societies at the same time are trade-offs between livelihood groups. For instance, graziers above all prefer grazing services and thus have interests that can be antagonistic to people who primarily depend on the collection of certain NTFP species. Hence, every land-use type also represents a different composition of synergistic and antagonistic user groups (tied to the ecosystem from the local to the global scale). In this light, ecosystem management and use can best be understood as a negotiation process between different user groups aspiring to benefit from particular ecosystem services.

While some trade-offs have been studied to some extent in the literature, the step of linking these to trade-offs between different groups of ecosystem beneficiaries has largely remained unaddressed. The studies that have documented trade-offs in this way generally have done so in terms of studying trade-offs between lumped groups of stakeholders brought about by a set of alternative land-use scenarios. Van Beukering (2003), for instance, researched the effects



of different alternative land-use scenarios in the Leuser national park in Indonesia on the ability of five different groups of stakeholders (the local community, the timber industry, the local and national governments and the international community) to benefit from the bundles of ecosystem provided by these alternative land-use scenarios. However, detailed empirical case studies that break up trade-offs between bundles of ecosystems in trade-offs between individual ecosystem services and their users have so far not been conducted. Studying trade-offs on this level will open up opportunities for the disaggregation of ecosystem-derived ('win-win') human wellbeing as an aggregate entity (see Daw *et al.* 2011) into winners and losers caused by synergistic and antagonistic benefit flows among different subgroups of ecosystem services beneficiaries.

As a concept, trade-offs between ecosystem services thus also enables the disaggregation of human wellbeing in ecosystem services research. It, too, pulls ecosystem-derived benefits back into the reality of the social relations in which they are embedded, albeit from a different, in this case ecosystem-based angle. In this way, it could be a complementary approach to the *Theory of Access*. Where the latter mostly empirically studies how power relations in the political economy surrounding resource use, determine who *currently is able to benefit* from natural resources and who is not, an ecosystem-based trade-off approach could contribute by taking the setting of biophysical (or ecological) boundary conditions as a starting point. This brings to light that social relations not only shape the distribution of the *existing* bundle of ecosystem services, but ultimately also can lead to *future shifts* in ecosystems to alternative land-use types with a different set of possible synergies and trade-offs between ecosystem services and their user groups. Hence this combined approach will enable a more inter-disciplinary analysis of the human-nature interface without losing out of sight either the biophysical reality (the absence of ecology in political ecology), or the sociological reality (the absence of sociology/political ecology in ecosystem services research).

## 2.5 Dis-services

Ecosystem dis-services were first operationalized by Zhang *et al.* (2007: 253) as the cost-side of the effects of ecosystems on agriculture, such as "herbivory and competition for water and nutrients by undesired species". Other researchers have subsequently paid attention to the concept in the context of hydrology (hydrological dis-services) (e.g. Lélé 2009), and mapping of the global impact of ecosystem dis-services caused by pathogens (Dunn 2010). As a common denominator, ecosystem dis-services can be defined as *the costs that ecosystems inflict on people* (e.g. Dunn 2010, Lélé 2009, Zhang *et al.* 2007). While it is common knowledge that ecosystems not only provide people with benefits, but also affect them negatively (e.g. in the form of human-wildlife conflicts, flooding, infectious diseases, etc.), these aspects of ecosystems have been completely disregarded in the ecosystem services literature (Lélé *et al.* forthcoming, Dunn, 2010). The notion of ecosystem dis-services challenges the idea that more ecosystems will lead to more benefits for human society. Moreover, taking up the notion of ecosystem dis-services in ecosystem services research increases the need to disaggregate the effects of ecosystems on people, as not only the benefits, but also the problems of ecosystems are differentially distributed among different actors in society. I argue in this thesis that in reality nature-people relationships are double-edged and complex, and therefore simplistic conceptualizations such as current ecosystem services thinking will not be able to adequately address these.



### 3. Methodology and data analysis

This thesis work is based on an empirical foundation of two and a half months of anthropological fieldwork in Teen Mauza community in Orissa, eastern India, between half November 2011 and the beginning of February 2012. During these months I stayed in the village of Basantpur, sleeping in the community hall and writing my notes and enjoying my meals in the small house of my 'host family' (this household is headed by a staff member of the Ranpur team of the NGO Vasundhara). Teen Mauza was chosen as a study area in close collaboration with the PEFESPA<sup>6</sup> team and it was decided to include this site both in the larger study of the project and as a detailed intra-community case study carried out under my responsibility.

#### 3.1 Ecosystem services under study

In order to be able to do a detailed assessment and documentation of the distributional effects of ecosystem services and dis-services in the community, in my research I have focused on a couple of specific services, falling under two different categories of the ecosystem services typology (see Figure 1.1 and MA 2005), which enables comparison between these categories.

*Grazing* for instance, has been a conflict-ridden form of resource use, ever since the British colonizers appropriated the village commons formerly used as grazing lands, with many a livestock holder being left with hardly any grazing opportunities for his livestock. The appropriation of the village commons and the categorization of those as Reserved Forests effectively turned them into no man's land and completely ruptured these lands from their former community management mechanisms which led to large-scale overgrazing (Gadgil and Guha 1995). Up to the current day over-grazing practices are seen as one of the causes of large-scale forest degradation (ibid.).

Especially in discourses enacted by the scientific forestry community and the Indian Forest Department, grazing, and goat grazing in specific, has traditionally been seen as a livelihood strategy that is inherently destructive for forests. As pointed out by Conway *et al.* (2002: 4) "[i]n Andhra Pradesh, high-level political statements in which goats were singled out as destructive animals have fostered a concerted anti-goat campaign amongst line departments and funding bodies, with efforts to discourage the provision of loans for the purchase and rearing of goats". This discourse stems from colonial times when the British deployed it to justify the appropriation of common grazing lands and forests to protect them from farther degradation, but in fact aimed at creating revenue for the state and a steady timber supply to the railway and ship industry.

By imposing regulations and forest closure, as well as heavy taxation of goat ownership, the Forest Department tried to curb the antagonistic effects of grazing on their scientific management for timber revenue (Grover 1997). Grazing thus is a complex and conflict-ridden resource use practice in rural India, which makes it an important topic of inquiry when studying the political ecology of ecosystem services in these locales. In the ecosystem services literature, the ecosystem service that provides goat grazing is usually referred to as the 'fodder provision' service (e.g. Egoh *et al.* 2010), as it falls under the provisioning services of the MA framework. In this thesis I will further use the term 'fodder provision' to refer to this ecosystem service.

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<sup>6</sup> See Annex A for more details.

Non-Timber Forest Products (NTFPs) are forest ecosystem services for the forest-dependent people in Odisha both in terms of sustenance and for generating cash income. The term NTFPs, literally includes “all products that are derived from forests with the exception of timber” (Ahenkan and Boon 2011), but in the study area there are some specific NTFPs which are being used as an important resource: bamboo (used as a separate category in this thesis), Siali leaves for leaf plates, honey, forest fruits, tubers, mushrooms, and medicinal plants. Out of these, I focused on the three main species of Siali leaves, tubers and mushrooms. NTFPs are especially collected and sold by tribal people in Teen Mauza, which makes the distribution of this ecosystem service an interesting topic for study.

Fresh or green bamboo is a very important building material in rural India, and for the construction of many of the rural houses at least some bamboo poles have been used. Also, bamboo is a very important resource for a group of low-caste basket weavers, who completely depend on the sale of bamboo baskets for their livelihood (pers. com. G. Rao, November 2011). Bamboo use is thus embedded in inter-caste relations, which makes it an interesting case when studying the distribution of ecosystem services.

In the Millennium Ecosystem Assessment cultural services are defined as “the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences” (MA 2005: 40). In this thesis, I have operationalized cultural ecosystem services by using the proxies of religious ceremonies (spiritual enrichment) and picnics (recreation) organized in, and individual visits (reflection and aesthetic experience) to the forest. In this cultural services are seen as an ‘act of community’ (pers. com. T. Crane, September 2011), and by seeing it as a physical manifestation of the social relations and dynamics in the village, certain inequities inherent to the village community might also be observable in the social relations surrounding the use of cultural services.

The ecosystem *dis-service*, that I am incorporating in my study is *crop damage* by wild boar and monkey, which is a widely occurring phenomenon in rural Orissa . What is interesting to note is that these two animal species have different physical characteristics, which for instance could explain why fences can be useful for keeping out wild boar, but might not have an effect on the acrobatic monkeys. What I would like to study is whether crop damage unequally affects different community members, taking into consideration that those who have landholdings on the fringe of the forest, are perhaps being affected more heavily than those with ‘better lands’. Could it be that the lands suffering most from crop damage by wild animals are in the hands of the villagers who are already poor? In other words, does this ecosystem dis-service disproportionately affect poorer community members?

### 3.2 Site selection

The site selection for the project and my study was done in close collaboration with the NGO Vasundhara, one of the contributors to the PEFESPA project, which has been closely involved with Community Forest Management (CFM) initiatives in Ranpur block over the last two decades. Two potential research sites were proposed by the Vasundhara staff, and out of these two Teen Mauza was selected, because it met most of the criteria for site selection that were formulated by the PEFESPA team. More specifically, Teen Mauza was selected after a short

reconnaissance visit, because it is a functioning<sup>7</sup> self-initiated CFM that has not been officially recognized by the Forest Department; because it has been functioning for the last 8 years, which enables linking changes in ecosystem service provision to community management; and because it has a sizeable forest-dependent, tribal population (20%).

### 3.3 General approach

I used an inductive two-step approach for conducting the fieldwork of my thesis, which was loosely based on the methodology of *event ecology*, developed by Walters and Vayda (2009): I organized my research questions around concrete events and inductively tried to find answers to my research questions through ‘eliminative inference’ among formulated alternative hypotheses. The first step of my research consisted of a rigorous **empirical analysis** to gain understanding of the different dynamics pertaining to the distribution of the **flows of ecosystem services and dis-services under study in the Teen Mauza community**. This part of the research had a more quantitative approach and was operationalized in my research questions in the form of ‘how-questions’. It was aimed at generating an empirically-grounded description of the resource use practices of different ecosystem user and livelihood groups focusing on how the ecosystem services and dis-services are distributed between these. The **household survey** was the most important method during this phase of my research.

The second phase of my research was an inquiry into the reasons *why* ecosystem services use of the services under study is distributed as observed in Teen Mauza, based on formulating situation-specific, plausible alternative hypotheses with regard to NTFP and bamboo collection, grazing, and cultural services. Next, using Walters and Vayda’s (2009) methodology I subjected these alternative hypotheses to “empirical scrutiny and evaluation, whereupon less plausible causes [were] eliminated in favour of those more plausible” (Walters and Vayda 2009: 541). Both the formulation and the testing of these hypotheses were based on a firm body of participant observation of goat grazing with a variety of graziers and herders active in Teen Mauza, of the collection of various NTFPs by the women of Akhupadar, of bamboo use and collection by Teen Mauza residents and the excluded low-caste bamboo artisans, and of community picnics in the forest.

Jansen and Vellema (2011: 169-171) point out in a paper on a new methodology for conducting technographies -specialized anthropological studies on the “use of skills, tools, knowledge and techniques in everyday life”- that it is more useful to focus on observation and participation rather than on (formal) interviewing, which often only exposes “the intentions before the act or the rationalizations thereafter”. As the inequities of ecosystem services use in Teen Mauza and the social structure and power relations in which this is embedded was a sensitive subject for conversation, it rendered formal interviewing unsuitable as a method of inquiry. Because, however, I was able to **observe** and *experience* the former through participant observation, I used this method as the main method for the second step of my fieldwork.

At this stage, just depicting the average situation of ecosystem services use would not be very illustrative, nor supportive for my inquiry into disparities, and, therefore, I aimed at elucidating the outliers, in this case those resource users who had become tied up most in the inequitable distribution of ecosystem services. Sampling in this part of the study was thus

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<sup>7</sup> Meaning that it has a functioning protection system with active daily forest protection. In the other potential site there were problems of elite capture by one of the village leaders, which had led to tension in the community and a disruption of the forest protection system.

purposive in nature. In the following sections I will describe in detail how I used the above mentioned methods for my study and how these have contributed to answering my questions.

### 3.4 Method 1: Participant observation

As I lived with the community I was studying, I learned a lot through general day-to-day observation of the village life and more focused participant observation: participating in forest-related activities, such as grazing and forest protection, and asking questions to the people involved about things that I could not simply derive from observation. While my study had an important quantitative aspect in the form of a household survey, my main emphasis was on *participant observation*, living with the people that I studied. This enabled me to “study (...) people as they go about their daily routines and activities” in a “relatively unstructured” and “interactive” way (Newing *et al.* 2011). As Newing (2011) *et al.* state, it is “[b]y accumulating these experiences [that] the researcher can build up a picture of ‘the way things are done’ and develop a deeper understanding of who these people are, how they think and how they differ among themselves”.

The main general objective of the participant observation in both stages of my research was to understand the lived experiences of the distribution of ecosystem services in the village and to triangulate the findings from the interviews and general observations: to link accounts of people to the *actual practices* that are going on (Jansen and Vellema 2011).

Using participant observation as an important mode of inquiry, I conducted my research in an inductive, rather than in a deductive way: inductive meaning that rather than testing pre-determined hypotheses through fieldwork, I used my initial observations and experiences in the village as a basis for formulating emerging hypotheses on the distribution of ecosystem services at my study site. These hypotheses remained under continuous scrutiny as I adjusted and readjusted them in case of the emergence of any unexpected or contradictory observations (see Waddington 2004). This corresponds to what Hammersley and Atkinson (2007: 159) argue on the conduction of anthropological fieldwork, as according to these authors “there should be constant interplay between data and ideas throughout the research process”.

In this way I iteratively built up a grounded understanding of people-forest relations in Teen Mauza. It enabled me to come up with an empirical description of the distribution of ecosystem services and dis-services among the villagers in Teen Mauza, while at the same time it provided me with insights in the causal mechanisms responsible for the distribution that I uncovered. After every day of participant observation, I reflected on the day’s activities and the lessons learned, structuring my observations in a written way in my field notes, while “beginning the process of highlighting important bits and *coding* them” (Newing *et al.* 2011: 95). In this I also made use of memos and annotations (see Newing *et al.* 2011).

By spending a lot of time in the field I also was able to build up rapport with the Teen Mauza villagers and gained a lot of background knowledge on local resource use and the customary institutions that relate to this. Both of these contributed to improving the quality of the data gathered through the household survey, as the villagers were more comfortable talking to us, and we had built up a good basis for probing on the questions.

### 3.5 Method 2: Introductory focus group meetings

After the pilot survey and before the survey process was fully started, I, together with the PEFESPA team organized officially announced focus group meetings in the three villages of Teen

Mauza. The function of these meetings that generally took several hours was mostly to explain the objectives of our study and to make explicit what the villagers could (and what they should not) expect from our research. These meetings were a good opportunity to get to know one another: for them to learn about our work and for us to get some critical background information on the forest protection system and its historical development and also to identify potential key informants. These meetings together with the many informal meetings with key informants in the villages (see informal (group) interviews) helped us to build up the rapport with the community that we needed for the household survey.

### 3.6 Method 3: Household survey

The first, descriptive phase of my field work predominantly consisted of the operationalization and carrying out of a stratified household survey. This household survey with a sampling rate of 40% was used to generate data on the importance of the ecosystem services and dis-services under study in the day-to-day activities and livelihood of the villagers (researching what ecosystem services are being used, at which use levels, from where, and at which frequency of use), linking these to the socio-economic characteristics of the 32 randomly selected households (out of a total of 76 households). The survey was stratified in three wealth strata on the basis of wealth ranking by the PEFESPA team (based on land holdings of all community residents, obtained from a local tax officer), which was validated by showing the outcomes of our wealth ranking to key informants in the community who then had the opportunity to shift households from one stratum to another. The reasons for shifting were also recorded to get a better insight into the wealth classification used by the villagers themselves. As the three villages of Teen Mauza are strongly organized among caste lines, in order to minimize the selection bias, a proportionate number had to be drawn from every village. Samples were thus drawn proportional to both village size and the magnitude of the wealth rank groups.

The sample frame was based on the list of participating households in the forest protection system of Teen Mauza as kept in the forest patrol register which functions as a log book of the patrolling duties. However, we found out that many people living in Teen Mauza did not appear on this list, as they have never been officially recognized as members of the forest protection community. Although we did not have the enough evidence to establish that these people were not significantly using resources from the forest<sup>8</sup>, we assumed that their use of ecosystem services was marginal and that therefore we did not have to include them in the survey. We were aware that by choosing not to include these people in the household survey we reinforced the exclusion policy of the 'hard core members' of Teen Mauza forest protection community, but organizing the survey sample frame differently was not feasible. I compensated this lack of survey data on these households through participant observation and ethnographic interviewing, so I could for instance gather data on the important livelihood group of excluded Scheduled Caste<sup>9</sup> basket artisans. The survey was divided in six modules: household demography, occupation and assets; livestock grazing and fodder collection; cultural services; ecosystem dis-services; forest protection; and a comprehensive fuel wood, timber and NTFP survey (see Annex D). The last module was

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<sup>8</sup> Inquiry into this was an extremely controversial subject, because any collection by these people would be seen as illicit by the larger community.

<sup>9</sup> *Scheduled Caste* is one of the government classifications in India as per the Government of India (Scheduled Castes) Order of 1936. This order is based on a list of castes, aimed at implementing reservation of seats in educational institutions and to creating government jobs for low societal strata (see Bose *et al.* 2011).

conducted separately for the more forest-dependent tribal households and was conducted as much as possible with women from the household (especially the NTFP part, because the tribal women are generally much more invested in NTFPs than the tribal men (see chapter 4.2 on NTFP provision)). In the latter households, the two separately conducted parts of the survey together took up two hours. The surveys conducted with the non-tribal (and a lot less forest-dependent) residents of Teen Mauza were conducted with the male household heads only and took about an hour in total. Surveys were mostly conducted on the veranda of the houses of the respondents.

The survey consisted of open questions, that were coded in order to aid the streamlining of the data entry. Probing, based on experiences and (participant) observation in the community was used to enhance the quality of the responses (e.g. knowing that in the community land ownership is classified in a lot of different ways, we probed into all these different categories of land in order to get a total picture of a household's landholdings). Contextual knowledge of resource use in Teen Mauza, also made us decide to include the absentee entrepreneur Ajay Das, although not part of the sample frame, in the sample: an especially adapted list of questions was prepared and used for a 1-hour interview with him on his farm.

The objective of the household survey was to find out for the identified ecosystem services which different groups of users there are in the village, making similar use of ecosystem services, such as farmers, or herders, and how these in turn can be subdivided in different socio-economic groups (with different levels of access to ecosystem services). The survey also provided me with a sample frame of the different livelihood groups such as (more well-off and poor) farmers/landholders, (more well-off and poor) livestock holders/herders, (more well-off and poor) NTFP collectors etc. This sample frame further served as a basis for selecting villagers for interviewing and participant observation. In this way the survey informed my fieldwork by elucidating how representative or typical a certain case was, and what the interview/participant observation sample should look like in order to be somewhat representative for the whole village.

In the field it turned out that the PEFESPA project team was going to do research in Teen Mauza at the same time as I was there. It was decided that it would be impractical if we would do two separate surveys, hence I decided to participate in the much more comprehensive survey of the PEFESPA team. In the end, the survey turned out to take up a much larger part of my fieldwork than I had expected. The drawback of this was that I had less time for participant observation and the testing of the alternative hypotheses that I formulated. At the same time, I used the serendipity of this confluence of my research activities and those of the team to get a much more rigorous statistical database on the distribution of the flows of ecosystems under study. Thus, while this unexpected dynamic shifted the balance between the quantitative and qualitative elements of my fieldwork more towards the former, this also enabled me to get a much more robust data base on the distribution of ecosystem services in Teen Mauza.

### **3.7 Method 4: Informal (group) interviews**

In addition to the survey, I conducted informal (ethnographic) interviews with a variety of villagers, both groups and individuals. Some of these community members became very useful key informants for my research. These interviews were mostly conducted while the respondents were doing their daily ecosystem-related activities, so that the interview was directly connected with the practice and not disconnected from it in a completely different and formalized setting. In doing this, I kept in mind the methodological considerations on informal interviews as highlighted by Newing *et al.* (2011: 93):



“Informal interviews are much like conversations, so you can expect a bit of give and take and no preset structure. So you might be hanging out at the local bar or café and start chatting with your neighbour, and something related to your topic (hunting, accounting) may come up. You might then just encourage them to elaborate, or ask them to tell you something about your topic. This is not the time to be provocative or combative; be respectful and listen, and encourage your respondent to keep talking”.

And:

“As your participant observation research proceeds you will learn about subjects that will need to be explored in greater depth, perhaps through more targeted interviews with known experts. These should also start off as unstructured open ended discussions and proceed to get more focused and more structured with each encounter. You should also cultivate friendships through repeated participant observation and casual conversations with *key informants*, those locally recognized experts in your particular field of interest”.

(Newing *et al.* 2011: 94)

Some key informants I got to know quite well and I visited them almost on a daily basis. As one of our key informants turned out to be working as a local tax officer, we obtained a list with the landholdings of all the community members. The key informants were also very useful in getting to talk to people who generally were very suspicious of our research. As we conducted the household survey first with one of the key informants we asked this person to inform the other villagers about it and tell them that they needed not to worry that participation in the survey would harm them in any way.

Because I did not master the local language of Odia I conducted my work with the help of a local translator which I found through Vasundhara. Because this translator grew up in the Ranpur region itself, living in a village which is quite comparable to Teen Mauza community, he himself became a very important friend and key informant for getting an understanding of daily life in this region.

### 3.8 System boundaries

In my thesis research, the (eco)system boundary was chosen to coincide with the boundaries of the Teen Mauza CFM forest, with only the villagers of the three protecting villages as ecosystem service beneficiaries. Ecosystem services used by the villagers from outside this boundary are thus not considered in the study, nor are non-Teen Mauza beneficiaries of the community forest. The rationale behind this choice of boundary is that for many direct ecosystem services the resource area matches with the area protected by the community, as for these services and goods there is a direct relation between active forest protection and the households involved in this on the one hand, and natural resource use on the other. Furthermore, most forest-protecting communities have a strong sense of ownership of and identification with their forest, and do not allow the collection of fuel wood, bamboo and timber by outsiders. It should be noted that on these grounds I decided not to include the people who migrated to Teen Mauza but have not been admitted to the forest protection system (see paragraph on sample frame of this chapter).

Arguably, there are other people living in the area who also derive benefits from the Teen Mauza community forest, but these benefits mostly pertain to regulating services of the forest such as pest control, micro-climate regulation, carbon sequestration etc. However, as my research is only focused on the distribution of the provisioning ecosystem services (NTFP, bamboo, and fodder provision), and cultural services, who are predominantly used by community members, the use of regulating services by outsiders falls outside the scope of my study.

In the field it turned out to be necessary to make an exception for the ecosystem service of fodder provision, and include use of this service by graziers from outside the community, as for this service ‘outsider use’ cannot be neglected. Because of the migratory nature of grazing it cannot be tied to a certain patch of forest, and also, traditionally, grazing has been quite unconfined when it comes to village and community forest boundaries. The fact that there are no rules pertaining to designated grazing areas nor any other restrictions for grazing in Teen Mauza (neither for community graziers, nor for graziers from neighbouring communities) can probably be contributed to these reasons. The general agreement among the different communities has been that graziers are allowed to graze neighbouring communities’ grazing lands and forests as long as the visiting communities also allow neighbouring communities to come to their land for grazing. In Teen Mauza, this system of reciprocal grazing is being exploited by a non-resident goat herd-owner from the nearby administrative capital, who grazes his 200 goats inside the Teen Mauza CFM area (and therefore has been included in the study), but is not tied to any of the surrounding communities.

One more exception to this operationalization of the system boundaries had to be made. Namely, there has been, and there still is at times, a large use of Teen Mauza forest’s green bamboo reserves by a small community of Scheduled Caste artisanal basket weavers just outside of Lakhapada. Because these people are completely dependent on green bamboo for their livelihood, but have been excluded from all the surrounding forest-protection communities they are forced to encroach on the bamboo reserves in Teen Mauza and the surrounding forest areas. I have included them in my study (as outside users of Teen Mauza community forest), because they are a very important livelihood group when it comes to bamboo use in the area, which should not be overlooked.

### 3.9 Data analysis

The data analysis was an integral part of my fieldwork as I worked in an inductive way (Newing *et al.* 2011), continuously triangulating my findings to assess whether the formulated hypotheses needed to be readapted, and I kept reflecting on whether enough information had been gathered to come up with a robust description of the distribution of ecosystem (dis-)services, or if there still were knowledge gaps.

I used the database of the household survey to generate frequency distributions with SPSS of the use of the ecosystem services of different user and livelihood groups. Also, I clustered the villagers in the most important user groups, based on this data. As my data indicated that caste, ethnicity and gender play a very important role in the clustering of resource use the survey was used to triangulate this general observation. The data of the informal interviews were grouped into different ecosystem user and livelihood groups in order to compare between them and infer how the benefits and dis-services from ecosystems are distributed in the village. I used the survey data to link these findings to the social position of the resource users in the different groups.



In order to derive at the most plausible of the alternative hypotheses as to why ecosystem services are distributed as they are, I coded my field notes on this as evidence/contra-evidence for the hypotheses. Subsequently, I pieced all these coded notes together, to infer which hypotheses were not supported by the data and to select for every research question the explanation that was the most plausible. In a last step of my data analysis, I linked my findings to the theoretical framework of the *Theory of Access*, which emerged as a very adequate framework for my research. Using this theory, I analysed my field notes in terms of how they fed into the notions of access mechanisms and power relations (see theoretical framework).

### 3.10 Methodological considerations

Although we had built up quite some rapport with the villagers before the household survey was started, we could not prevent some response bias. This especially was the case with the responses pertaining to crop damage, because some people in the community were hoping that we would somehow be able to arrange financial compensation for them. Also when it came to bamboo use, which in Teen Mauza is strictly regulated by a use quatum, people had a clear incentive to not report bamboo use beyond the allowed quatum.

Knowing these limitations of the household survey, I used the survey data as a general frame of reference, indicating the order of magnitude of the resource use of the Teen Mauza residents, and as a sample frame for further participant observation. In general, I interpreted the data pertaining to restricted ecosystem services (bamboo) as being conservative estimates of use levels and those services subject to likely over-reporting (mostly crop damage) as too high estimates. Also, since my research was aimed at studying the distribution of ecosystem services between user groups, the absolute use levels of ecosystem services of every user group are not as relevant as the relative differences between them: the central premise of my thesis being that ecosystem services are being inequitably distributed.

As far as possible, I made sure that the figures obtained (especially the outliers) were in some way triangulated through informal interviewing or (participant) observation. Often it helped to come back to respondents, discussing with them how their answer diverted from the answers of the other respondents. By making this divergence explicit, the motivations of some of the villagers to over-report were laid bare. The latter was also pointed out by Newing *et al.* (2011: 117) as an important aspect of qualitative research: debriefing findings with the respondents: “[Y]ou need to explore the issue further until you understand why there are discrepancies. Be tactful in how you do this – it would be highly inappropriate simply to say ‘but so-and-so told me the opposite of what you have just said’. Instead you probe, observe and triangulate further until you are confident that you know what your data represent”.

The chapter on cultural services is kept shorter, because the distribution of this ecosystem service is mostly determined by one parameter: gender relations. These relations were already described in chapter 4.2. Pertaining to cultural services there also are only two important user groups: women and men. Among all the other community members of Teen Mauza there were no significant differences in the use level of cultural services. I decided to nevertheless represent cultural services in a separate chapter in order to enable comparison between this type of ecosystem services and the other services studied in this thesis (all provisioning services).

Throughout my results chapters, I have inserted break-out boxes in which I present short snippets of detailed narratives based on my participant observations in Teen Mauza community. These boxes function as a window looking into the world of Teen Mauza for the reader and provide a qualitative body and context to the more quantitative frequency distributions of ecosystem

services in the community that from the basis of my results chapter. This will enable the reader to gain an insight into the observation and lived experiences that formed the basis of my analysis of the distribution of ecosystem services in the community and its embeddedness in social and power relations.

### 3.11 Additional limitations of this research

In the available time of my thesis work, it was only feasible to study a limited set of ecosystem services in Teen Mauza. Because research into the distribution of regulating services would be much more complex, as the measuring of these indirect services is a lot less straightforward than it is for provisioning and cultural services, I did not include these in my study. I did observe, though, that hydrological services in Teen Mauza are very important and that there is a very significant difference in the groundwater levels between Akhupadar which is situated in a valley at the forest fringe, and Lakhapada which is much farther from the forested range. Also, people actually mentioned that there at times are drinking water shortages in Lakhapada, while this is not the case for the other two villages. It is thus expected that the distribution of hydrological services in Teen Mauza is not equal and therefore is an important area of inquiry. Further study is needed to back this general observation with empirical evidence and in general there is a need for more research on the distribution of regulating services and how this relates to the distribution of the services (and trade-offs) that I already researched in Teen Mauza. A part of this work is still on the agenda of the PEFESPA project, which also aims at researching the distribution of regulating services such as pest control, hydrological services and carbon sequestration.

Lack of time was a general constraint during my research: 2.5 months is not enough time for in-depth political ecology research, as it takes quite some time to build up the necessary rapport with the community for this kind of inquiry. More time was needed for a robust assessment of alternative hypotheses as to why ecosystem services are distributed as observed, and to link findings to a historical trend analysis, grounding it in the historical context of the region (historical analysis is an important part of political ecology research – see theoretical framework). In fact such ‘causal historical analysis’<sup>10</sup> would have been very instrumental in explaining the social and power relations in Teen Mauza and for instance the fact that tribal people in this part of Odisha have a higher status than Scheduled Caste people. Also, as previously mentioned, the household survey took up much more time than I expected, which shifted my research a bit more towards the quantitative side.

The timing of my fieldwork was a little unfortunate, because it coincided with the harvesting season. In the first couple of weeks of my research, many of the (male) members of the land-owning households were out in the fields to harvest rice for around twelve hours a day. This meant that in these weeks there were not many opportunities for me to speak much to people, or to start piloting the household survey. I learned that the timings of important activities linked to the seasonal calendar of the rural community such as sowing or harvesting should be known by the researcher before entering the field.

Nevertheless, I used my time as well as possible to build up rapport with those who were available and planned my communication time during the lunch breaks, making sure that my research did not get delayed too much.

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<sup>10</sup> See Walters and Vayda (2009).

Since I did not master the local language of Odia, and, nor I was very fluent in Hindi<sup>11</sup>, I had to do all of my field inquiry through an interpreter. Since the interpreter that I employed is from a local village, he himself turned out to be a very important informant. The fact that he was seen as a local, also contributed to building relationships with the people in the village, because in this way they did not see all the researchers as complete strangers. However, there were some downsides of working through an interpreter, as it was very hard to have informal one-on-one conversations with people, or in-depth discussions. Since my methodological emphasis was not on interviewing or discursive practices, it was possible to largely compensate for these downsides by means of the other methods used.

### **3.12 Ethical considerations**

Before commencing my research in Teen Mauza, I had an informal chat with the President of the forest protection committee asking him for permission to conduct my research in his community (thereby paying respect to his role as a ‘gatekeeper’ for my research (Hammersley and Atkinson 2007)) and telling him about my research plans, methods and objectives. Upon his agreement I started living in the village of Basantpur and started my inquiry. In order to respect the ethical codes of anthropological fieldwork, I drafted a letter on my research plans, methods and objectives, which also included my contact details and that of the PEFESPA project leaders (see Annex E). Moreover, I wrote in this letter that if respondents would indicate something as confidential, I would leave it off the record upon their request.

This letter, I had translated in the local Odia language by one of the staff members of the field team of Vasundhara, after which I presented copies of it to the President, Secretary and Treasurer of the forest protection committee for signing. These signed letters (see Annex F) together with the initial village-level meetings that we conducted and numerous informal conversations with key informants (whom we mobilized to discuss the matter with the other villagers) made sure that free, prior and informed consent (see Newing *et al.* 2011) of the community members was obtained. As I stated in these letters that I would treat the material obtained confidentially, I decided to change the names of the important key players and informants which are featured in my report.

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<sup>11</sup> This language is not being spoken by everybody, but certainly could be considered the second language in my study area.

## 4. Results: The distribution of ecosystem services in Teen Mauza

In this section I describe the results of my case study on the distribution of ecosystem services and dis-services among different user groups and livelihood groups in Teen Mauza. The four services which will be subsequently presented in this section are NTFP provision, bamboo provision, fodder provision, and cultural services. This will be followed by the assessment of the dis-service of crop damage by wild boar and monkeys. After an empirically-grounded description of the distribution of the flows of ecosystem services in the community, I analyse this distribution in terms of the Theory of Access, looking at what the role is of access mechanisms in the found the distribution, and how the latter is embedded in social and power relations in the community.

In this section, I use two different terms for the grouping of ecosystem users: livelihood groups and user groups. The first of these I define as groups of user which use one service for an important part of their livelihood or subsistence, for instance NTFP collectors, bamboo collectors, and graziers. The second term of user groups is used for the subgrouping within livelihood groups, for instance community graziers, graziers from neighbouring communities, and the absentee grazier.

### 4.1 Background on Community Forest Management in Teen Mauza

Teen Mauza is situated in the Ranpur block (sub-division) of Nayagarh district, one of the 30 administrative districts of Odisha state. In Ranpur block, there currently are some 180 active community forest management (CFM) and villages (out of total of 231 villages), which are involved in protection communities that differ in scale from the single-village level to cluster-level communities of up to eleven villages (pers. com. G. Rao, November 2011). On a landscape scale, this means that most of the Revenue Forests of the Ranpur range have been reappropriated and are actively being used and protected by the communities on the surrounding planes. All of these CFMs are part of the block-level forest protection federation which goes by the name of Maa Maninag Jungela Saraksha Parishad (MMJSP) and is active in coordinating and mediating between the communities, for instance in times of conflict, and plays an advocating role in the block's (and district's) forest policy arena.

#### *Historical development of forest protection in Teen Mauza and the surrounding communities*

The Teen Mauza (literally 3 villages) CFM was started in 2002 by the villages Akhupadar, Basantpur and Lakhapada in a degraded patch of Reserve Forest. Prior to the formation of Teen Mauza, the tribal<sup>12</sup> village of Akhupadar had already started protecting the forest patch on its own accord in 1995-1996, although it did not succeed to keep encroachers at bay. After an interruption of about a year, it reinvigorated its forest protection system in 1998, this time together with the village of Basantpur. However, because of a major conflict between the two villages related to an inter-caste marriage, not even two years after the restart, the forest was rendered unprotected for several years, up to the second restart in 2002 (this time with a total of three villages). In this last break in the forest protection efforts, while the villages were fighting over the marriage case, the forest, once more, got heavily degraded, because of timber theft by surrounding communities and the organized timber industry.

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<sup>12</sup> The people of Akhupadar are of the Kondha tribe.

The villages of Basantpur, and Lakhapada together with the neighbouring villages of Basudia and Areda, prior to the formation of the Teen Mauza protection committee, had also already cooperated in protecting another patch of forest, a Protected (or Village) Forest near Basantpur and Lakhapada from 1985 onwards. This forest is part of the same ridge, but is situated on the other side of the Akhupadar valley (see Figure 4.1.1). Due to a conflict in the early nineties Areda and Basudia terminated their participation in the protection of the forest patch, and with the help of a local forest-rights NGO, Vasundhara, they negotiated access to a forest patch for themselves. Basudia negotiated access to a 50 acre patch adjacent to the Teen Mauza CFM area (along the eastern boundary) and Areda got a 100 acre patch east of the Lakhapada Protected Forest patch, but registered this officially as a Joint Forest Management (JFM) initiative with the Forest Department. Within the framework of this joint venture, Areda also developed a small 10 acre teak plantation together with the Forest Department.

In the process, Basudia, which is situated farther away from the forested Ranpur range got allotted a relatively small patch of forest on the north side of the Akhupadar valley, while Areda, which already is closer to the ridge, got a patch on the south side (see Figure 4.1.1). The allocation of forests over the last decades to the various communities in the area, not always related to their geographical location, has altered resource using patterns significantly, and at present, communities are not always deriving most benefits from the forest that is nearest to them (for dis-services, such as crop damage by wild boar, however, those closest to the forest still do suffer most damage). For instance, Basudia residents do derive most of their fuel wood and bamboo from their forest patch on the north side of the valley, but for grazing depend more on the nearby forest patches belonging to Areda and Lakkhapada.

Apart from the ones mentioned above, there are some other community forest areas surrounding the Teen Mauza CFM patch (as can be seen in Figure 4.1.1). To the west of this patch an adjacent 500 acre patch of forest is combinedly being protected by ten villages and hamlets (this forest protection committee is known as Dasa Mauza), while in the north, on the other side of the hill ridge there are patches that belong to the communities of Chhatipur, Haripur and Shankhamula. Most of the forests on that side have been appropriated by the village of Haripur which happens to be the residential place of the Secretary of MMJSP; it has claimed 600 acres as community forest, while one informant of Akhupadar stated that he counts a total of 1250 acres as their forest.

Many of the encroachers coming to the Teen Mauza community forest are known to be from Haripur and Sankhamula and some of these illegal harvesters were seized during my fieldwork period. The reason for this is that these villages are quite large in size (60 and 115 households respectively) and have not succeeded in protecting their own forests successfully, which has led to degeneration of their forests into shrubland with a very much reduced provision of ecosystem services.

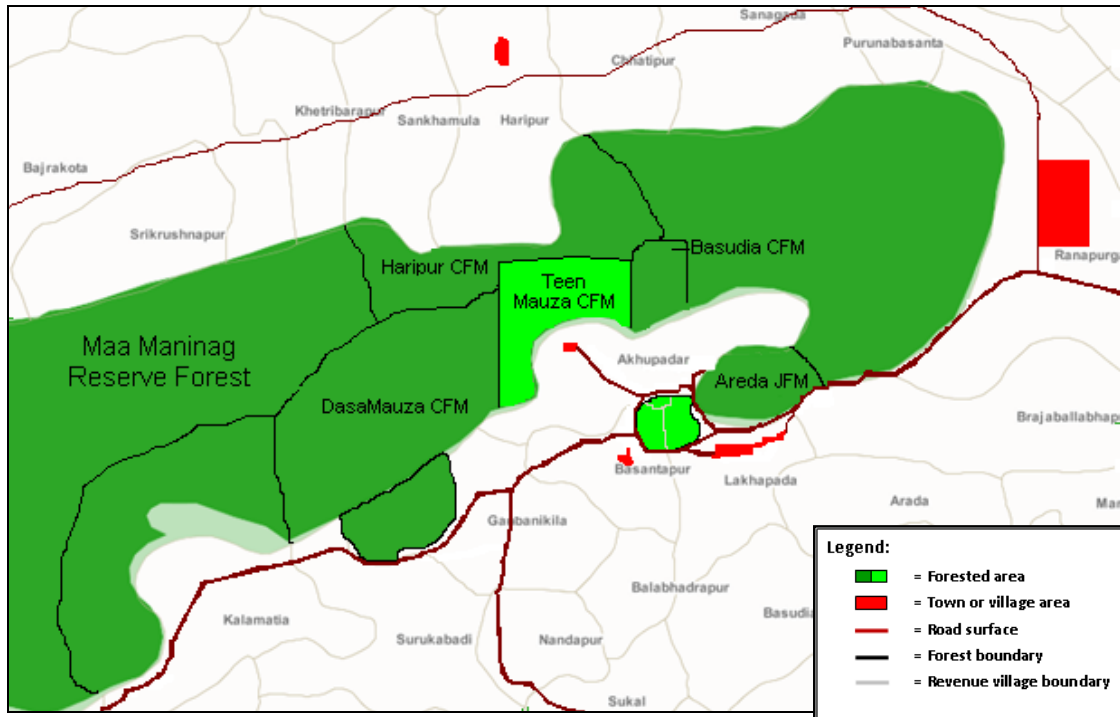


Figure 4.1.1: Map of Teen Mauza CFM and surrounding communities and forests (adapted from [www.odishasampad.in](http://www.odishasampad.in))

The CFM forest is situated on a hillside which rises up steeply from the plane, from around 70 to a maximum of 420 msm at the hilltop of Bara Mundia, situated at the far northwest corner of the CFM area. This is the general characteristic of the forests in the area: most of the remaining forests are situated on the steep slopes of the Ranpur range, and the hill ridge to the south of the main Ranpur valley. The Ranpur range is characterized by rocky outcrops and ridges of laterite stone that can be seen from afar, and one of these outcrops is the centre stage of a very important ceremony that is attended by people from all surrounding villages to invoke the rains if the monsoon does not timely deliver its expected and much-needed precipitation. In addition to the hilly forests there is some green space in the form of plantations of Acacia, Eucalypt, fruit trees, cashew, and coconut, surrounding the villages on the plane. Apart from the forested areas and the village areas and plantations, the landscape is dominated by a mosaic of small agricultural fields, bordered by small ridges which are used as foot paths during cultivation. Mostly the local farmers cultivate one crop of rice and a second crop of pulses or vegetables; the agriculture in Ranpur is mostly small-scale, family-based and rain-fed, with some additional irrigation through the pumping of water from open wells.

The village of Akhupadar is situated closest to the Teen Mauza CFM area (and thus also to the Reserve Forest), adjacent to the forest's foothills, and hence it is functioning as the forest's gateway village. Because of its proximity to the forest, the village's laterite soils are favourable to the production of rice, pulses and other vegetables: I observed that the water in the wells next to the road is always high, even after pump irrigation. Although the forest takes care of a continuous groundwater flow, there are no perennial streams coming out of the forest, only some small springs which release their waters from the foothills.

On a landscape scale the laterite soils of the area in general are classified as ‘light textured red soils’, with low water retention and low natural fertility, while being highly erodible (PPTA Consultants 2007). Since Basantpur and Lakhapada are situated farther from the forest and for that reason the water availability is much less<sup>13</sup>. This makes agriculture on these rather poor soils quite difficult.

Topographically, Lakhapada and Basantpur are situated along the main road of the northern part of the Ranpur valley, a mere 5 kilometres from the block’s administrative capital which has the same name, where the nearest market is situated (Ranpur has 9,000 inhabitants (ORSAC 2012)) (see Figure 4.1.1). Akhupadar can be reached by a short half-kilometre-long unsealed road that branches off from the main road in north-western direction close to Basantpur village. Teen Mauza is thus well connected with the outside world and has a good market access.

Due to the community’s efforts over the past ten years, the forest has regenerated steadily from shrubland to a denser forest stage, but the regeneration is still on-going. In physical terms this means that at the moment most of the trees are below 50 cm in girth size. Ecologically, the forest is dominated by large bushels of bamboo (the PEFESPA field team measured a total bamboo coverage of about 30 percent in the CFM area). As seen from the plane, the hillside looks green, as it is quite densely covered with climbers, shrubs and small trees. It is rich in its birdlife and in the mornings many birdcalls can be heard from afar, including the characteristic call of the wild peacock which is well-established in the forest (eye witnesses have reported sightings of up to 200 peacocks). The forest is also home to a variety of snakes amongst which the king cobra, and a variety of small and larger mammals, such as rabbits, hares, mongoose, squirrels, wild boar, spotted deer, barking deer, monkeys (Hanuman langur), Sambar deer, wild buffalo, jackal and hunting leopard. Every once in a while, but not more than once a year the forest is visited by a herd of Indian elephants, which in many cases has dire consequences for the crops in the villages’ fields.

At the moment, a total of 76 households are involved in the forest protection of Teen Mauza, with Lakhapada having as many involved households as the other two villages combined. The forest protection system is organized on the basis of a rotating forest-patrol duty between all the households involved. The local name of this system is Thengapalli, which literally means ‘door-to-door stick’, the stick indicating the one who is on duty, just as the baton in the Olympics’ relay race. Every day there are two male guards in the forest to protect it from outsiders. These ‘outsiders’ are mostly villagers from adjacent villages, but there is also an active private timber industry/timber mafia in the area. On paper, these guards are on duty between 9 AM and 6 PM, but this is never observed, as the lunch break of several hours is inviolable. The forest guards on duty have to sign out upon leaving the forest when their duty is finished, and the register is kept in Akhupadar. As there are 76 households involved in the forest protection, every household has to send one of its male inhabitants once in every 38 days. Since some households have a shortage of male members, sometimes boys as young as 15 years old are send on duty; the eldest forest protectors are around 65 years old. In a few exceptional cases women help with forest protection, but this only holds for the tribal village of Akhupadar as here the women are less tied to the domestic sphere and in general play a much more important role in generating

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<sup>13</sup> The water table in the wells of these villages is at least two meters lower than in Akhupadar. In Lakhapada some villagers reported to have suffered from drinking water shortage at times during the summer months.

income (in cash and in kind) for the household. Even here, this is limited to only a few women, mostly widows.

The enforcement of the protection duty is quite strict, although there is a lot of freedom in the individual expenditure of labour hours while on duty. Households are allowed to exchange duties with one another in case no one is available, but if the duty cannot be taken over by any other household, a payment has to be made that is equal to a day's labour wages (about Rs. 150,-), so that a paid guard can be sent on duty. In case the household lags to long with the payment of this fee, it will be fined up to Rs. 500,- in addition.

Institutionally, the forest protection is headed by a forest protection committee (FPC), which consists of a President (from Basantpur), Secretary (from Lakhapada) and Treasurer (from Akhupadar), supported by a handful of active members. The FPC members are responsible for the daily management of the protection system and the enforcement of protection rules, as well as conflict resolution. Also they are in charge of calling regular general member meetings, held around three times a year, with additional meetings in case of emergency. The President of the FPC also functions as representative in the block-level forest protection federation (MMJSP), and a handful of people from the other villages also is enlisted as a General Member of this body.

Although the Forest Department has tried to talk the Akhupadar villagers into converting their CFM into a Joint Forest Management committee by promising them a large sum of money, the village's representatives ardently refused the offer as they mistrust the Department and do not believe in its staff's "false promises".

As to forest dependency, Akhupadar is the only village which is directly dependent on the forest. Men and women of this village collect fuel wood, green bamboo, and non-timber forest products (NTFPs) such as leaves of the Siali vine to stitch leaf plates, used for the serving of food (widely used in India and a good source of extra income for women), tubers, mushrooms, honey, fruits, and green leafy vegetables. In the other villages (except for a few rare exceptions) only men collect forest produce -mostly fuel wood and green bamboo- and in general NTFPs, especially the locally very popular edible tubers, are only acquired by means of buying them from the Akhupadar villagers. Some richer households also buy fuel wood and green bamboo from the latter. Therefore, one could classify the Akhupadar villagers as having a more forest-based livelihood, in cash as well as in kind, complemented by income derived from agriculture, while the villagers of Basantpur and Lakhapada are mostly farmers, sharecroppers and labourers (working for daily wages; 44% of the households in Lakhapada was classified as landless) who primarily depend on the forest for fuel wood, and use money generated from agriculture and daily labour to buy other forest produce.

The most obvious ecosystem services directly used by the community are provisioning services providing fuel wood (for daily cooking), bamboo, NTFPs, and fodder for grazing; and cultural services, such as religious ceremonies in the forest, picnics in the area, and the occurrence of the culturally revered wild peacock. Apart from these obvious services, some indirect or regulating services are also very important for the community: naturally occurring pest control and pollination, and hydrological services from the forest for instance, are important contributors to the local agricultural production of rice and pulses, and the forest also protects the villages against erosion (in the form of mudflows) and flooding and plays an important role in regulating the local microclimate. These latter services fall under the category of regulating services in the MA framework (see MA 2005), but due to their complex and indirect workings it was not feasible for me to include them in my case study.



## 4.2 Distribution of and access to the NTFP provision ecosystem service in Teen Mauza

NTFPs form an important forest resource for the forest-dependent people in Odisha. In Teen Mauza it are the tribal people from Akhupadar who are most forest-dependent collect and they use a wide variety of NTFP from the forest: Siali leaves, honey, all kinds of fruits, over ten kinds of green, leafy vegetables, a variety of edible tubers, medicinal plants, over eight kinds of mushrooms, and date palm leaves for mat weaving. Most of the other households, the non-tribal families of Basantpur and Lakhapada, primarily depend on fuel wood and bamboo, but in general do not collect much else, apart from some mushrooms and a handful of berries while on forest protection duty.

We found that 83% of the tribal households and none of the non-tribal households collect Siali leaves from the forest for the making of leaf plates; 83% of the tribal households collect honey (from Teen Mauza but also from the wider surrounding forest areas of Maa Maninag Reserve Forest), against 25% of the non-tribal families; 83% of the tribal households collect fruits and vegetables, against 44% of the non-tribal families, 67% of the tribal people collect medicinal plants, while of all the non-tribal people 46% collects (but a much smaller variety); all of the tribal households collect tubers and mushrooms, while of the non-tribal households respectively 42% and 50% do so. When looking at quantities harvested, and the percentage of households collecting, edible tubers and mushrooms are overall the most important NTFPs collected.

The tribal people from Akhupadar are the only residents of Teen Mauza who also sell produce from the forest to gain some subsidiary income: 100% of the Siali collecting households sells leaf plates (these leaf plates are typically made for sale only), in the case of tubers and mushrooms 17% of the collecting households in Akhupadar sells part of their harvest.

In Table 4.2.1 the total 'flow' of the ecosystem service of NTFP provision (main species) from the Teen Mauza community forest to the community is featured. The table shows the income earned by the tribal households through the sale of Siali leaves, as well as the average quantities collected of the main NTFPs - edible tubers and mushrooms - by both tribal and non-tribal households and the percentages of households collecting, as well as the percentage of the total number of tribal and non-tribal households in which women collect (part of) the harvest.

The numbers shown in the table are derived from the household survey done in Teen Mauza. Although this household survey gives a very good indication of the general resource use among different user groups in the community, the reliability of the individual responses is discussable as it has proven very difficult for the respondents to come up with a lump sum of their collection of NTFPs per year. In general the respondents could recollect the average collection over the last months, but since the collection is very variable in different months and seasons it was hard to convert these values to a yearly total. Also, for various reasons the respondents might not want to report truthfully about how much they collect and how much of this they sell. While the veracity of the individual percentages in the table can be put to question, the data does underpin the general state of inter-user group differences in NTFP use in Teen Mauza, and any veracity improvements within the survey would not very much effect these differences. Also, the exact magnitude of these differences is not crucial to my argument that ecosystems differentially effect the relevant user groups.

Table 4.2.1: Use of main NTFPs in Teen Mauza

	Tribal people from Akhupadar	Percentage of HHs collecting (% by women*)	Basantpur and Lakhapada villagers	Percentage of HHs collecting (% by women*)
Number of HHs in Teen Mauza	15		61	
Average yearly per HH income from Siali leave sale in Rs. (min-max)	7,350 (3,000-14,400)	83% (83%)	-	-
Average yearly per HH collection of edible tubers in kg. (min-max)	290 (15-700)	100% (83%)	7.6 (1-30)	42% (0%)
Average yearly per HH collection of mushrooms in kg. (min-max)	22 (15-35)	100% (80%)	2.6 (1-10)	50% (4%)
Percentage of total amount collected in Teen Mauza (tubers/mushrooms)	90%/68%		10%/32%	

\* percentage (of the total number of households (HHs)) of households in which women collect

The table shows that both in relative and in absolute terms the tribal households of Akhupadar are using the majority of the NTFP provision service, although they only make up 20% of the population of Teen Mauza. For instance, in absolute terms, all the 61 households of Basantpur and Lakhapada combined are only making use of 10% of the tuber provision service of the forest, while the 15 households of Akhupadar are using 90% of this service. For mushrooms the numbers are 32% and 10% respectively. In relative terms, on a per household basis, the average yearly collection of tubers in Akhupadar is over 38 times bigger than that in the non-tribal villages, while for mushrooms this factor is about 8.5.

Another important aspect of NTFP collection depicted in the table is the distribution of this ecosystem service among gender lines. The tribal women of Akhupadar are very much involved in the collection of NTFPs (in over 80% of the tribal households women are involved in the collection of the main NTFPs shown in Table 4.2.1). On the other hand, in the non-tribal villages of Basantpur and Lakhapada, none of the women aids in the collection of tubers and only 4% of the respondents mentioned that women of the household are involved in the collection of mushrooms. This is true for all the forest-derived products, including fuel wood and bamboo (for fuel wood the percentage of non-tribal women collecting is a little higher, 15%).

Siali leaf is an NTFP species that is especially linked to women and is used by them to generate some subsidiary income. Although in a few households men help with collecting the leaves, the value addition step of stitching the leaves into leaf plates, using small bamboo slivers, is purely a women's activity that is combined with the daily household work. Siali is the only NTFP used from the forest to which extra value is added through some form of processing. All the other NTFPs are sold in the form in which they are collected from the forest. Siali is especially important, because the revenue obtained from collection and value addition is seen as 'women's income' which can be spend on things that are deemed important by the women themselves, while purchasing decisions for all the other money gained by the household are always decided on by men. This gives the women space to purchase for instance some badly needed new clothes, or other things for personal use, that normally would not be bought by the male-dominated households (some women literally said that their cloths were in a very bad stage before they recently got the opportunity to buy a new sari with the money from the sale of leaf plates). Hence,

Siali leave collection and leaf plate stitching serve as means of financial empowerment for women. As shown in table 4.2.1, the maximum yearly income obtained through the sale of leaf plates is 14,400 while the average lies at 7,350. This subsidiary income for the women in the household is equivalent to 27% and 14% of the local minimum wage<sup>14</sup> respectively.

One household in Akhupadar reported to earn about Rs. 21,000 from the sale of NTFPs excluding Siali leaves, but including head loads of fuel wood. Also this household, headed by a local priest and folk healer, reported to sell medicinal plants to the pharmaceutical industry for several tens of thousands of rupees per year (equivalent to a total subsidiary income of about 95% of the minimum wage). However, this house is an outlier and most of the households only earn a fraction of this as subsidiary income from the forest.

These income estimates for the tribal households should be seen as an extra revenue for the household in addition to the use of NTFPs for subsistence needs. All of the tribal households base a substantial part of their diets on forest-derived goods (especially tubers). As most of these households also produce rice and pulses, a large part of their diet is already being provided by forest and field.

While the tribal households in Akhupadar both derive a part of their diet from the forest and earn an extra living from selling forest produce, the non-tribal households are a lot less directly invested in the forest. In general, most of the non-tribal households have non-forest-based livelihoods such as agricultural production and wage labour, and the money generated by these they use partly for buying forest goods, mostly tubers (50% of the households in Basantpur and Lakhapada reported to sometimes buy tubers from the Akhupadar villagers, while they themselves only collect 7.6 kilograms per year on average).

#### *Access mechanisms and power relations: ethnic identity, skills, knowledge and gender*

In the case of Teen Mauza, all the community members have the same customary user rights pertaining to the harvesting, processing and sale of NTFPs. At the same time, the distributed use of NTFPs as shown in Table 4.2.1 suggests that access to, or the *ability to benefit* (Ribot 1998) from NTFPs is not the same for everyone in the community. In this section I will explore which access mechanisms enable the user group of the tribal inhabitants of Akhupadar to use much more of the NTFPs present at Teen Mauza forest for subsistence and livelihood support than the non-tribal people.

When directly asking the people from Basantpur and Lakhapada why they are not collecting and selling any Siali leaves<sup>15</sup> or other NTFPs, the answer was always along the lines of: “We are not tribal people; they are tribal so they make a living from the forest”. When I asked the President of the forest protection committee why the Akhupadar people also sell fuel wood to people from surrounding communities, he answered: “This is their occupation as tribal people”.

Asking the tribal people from Akhupadar these questions, generally made them stress the importance of the forest to them and that they feel it nurtures them as a mother. They explained me and my colleagues that they see themselves as children of the forest who have inherited their close relationship with the natural environment from their parents. This close relation of the tribal people with the forest in general was supported by my observations and fieldwork in Teen Mauza, but it is important to note that the younger generation is showing the tendency to move

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<sup>14</sup> The general consensus in the area was that the average minimum wage for a day’s work is about Rs. 150,-, which leads to Rs. 4500,- per month.

<sup>15</sup> Siali is the only NTFP that is not at all being collected by the non-tribal community members.

away from the forest for their occupation. In fact, many of them have already left the village of their parents to work in the cities, or as a farmhand on some commercial farm.

Access to NTFP resources from the Teen Mauza community forest and especially to their sale thus seems to be very much linked to ethnic identity, and the stereotypes that surround this phenomenon. It became very much clear from my conversations with the non-tribal inhabitants of Teen Mauza that for them the making of Siali leaf plates or the sale of other forest produce is ‘not done’, it would put them among the ranks of the tribal people. Although the tribal people in Ranpur are not so much at the bottom of the social hierarchy as in the rest of India, they do rank lower than the General Caste people from Basantpur and Lakhapada.

All the while, most of the tribal people of Akhupadar generally are deriving subsistence and are earning subsidiary income from the use and sale of NTFPs (including fuel wood and bamboo), even to such extent that, as I observed, they do not need to work as hard on their fields as the General Caste people of the community. Because the tribal people are associated and identify themselves with the forests they are able to make good use of the direct ecosystem services it provides them with. There is a central contradiction involved in this position of the tribal people in Teen Mauza: on the one hand they are able to make good use of the forest to such extent that they are quite well-off, but on the other hand by doing so they confirm their lower status in the social hierarchy of the community. The reverse side of this story is that although some of the very poor non-tribal people of Teen Mauza could very much need some extra forest-based income to get by just a little more easily, their General Caste status does not allow them to make much use of the forest’s ecosystems.

Box 4.3.1: A tribal youth and his ambiguous relation with the forest

Sunil, the grazier boy from Akhupadar tells us that he aspires to work in the construction sector in big cities such as Nagpur and Bangalore. He has already been there several times for a couple of weeks. He says he doesn’t like the goat herding work at all and that he thinks that it is very boring. Hearing all this I ask him if he likes the forest at all, or if he likes cities more and just wants to leave the area as soon as possible. To my surprise he answers me that he thinks that life in the city is quite difficult, because over there, “there is no forest that is providing us with food and materials” for daily sustenance. I am surprised to hear that even a boy as Sunil, who feels so much out of place in his little village, unwillingly herding the goats of his parents, still sees the forest as such an important part of his life.

Related to the issue of cultural identity are the related issues of the access mechanisms of skill and knowledge pertaining to recognizing and harvesting edible and medicinal plants in the forest. Although the collection of Siali leaves is seen as a purely tribal occupation, some non-tribal households do collect tubers and mushrooms (42 and 50 percent respectively). When linking these percentages of tuber and mushroom collection to the socio-economic characteristics of the households, an interesting pattern emerges. First, only 9% of the non-tribal tuber collectors is from the highest wealth rank (there are three wealth ranks in total), while 73% is from the lowest wealth rank (mostly comprised of marginal farmers and landless sharecroppers and wage labourers). For mushrooms, 23% is from the highest wealth rank, while 62% is from the lowest. Second, among the low wealth rank non-tribal households the percentage collecting tubers or mushrooms is 73% for both of these NTFPs. The collection of both tubers and mushrooms by non-tribal Teen Mauza residents is thus higher among the poor, while the collection of tubers is more strongly related to the poverty status of the household than that of mushrooms.

The reason why only a minority of the non-tribal households collect these NTFPs could apart from ideas of identity, also be related to the lack of knowledge or skill, which might be acting as an access barrier for these resources. However, these issues of identity, and skills and knowledge could be very much interwoven. Although I have not literally asked it, I got the impression that accessing knowledge pertaining to the harvesting of certain NTFPs is difficult for conservative non-tribal people in Teen Mauza, as they perceive this knowledge as being tied to ethnic identity and therefore consider it inappropriate. Other people who do harvest tubers and mushrooms from the forest (and thus have access to knowledge), have enough harvesting knowledge to collect Siali leaves as well, which is a relatively simple activity. However, ideas about ethnic identity and the traditional occupations linked to this, are preventing them to engage in the latter.

Another important access mechanism, related to the issue of labour shortage explained in the results chapter on grazing in Teen Mauza, is time investment, or opportunity costs. People might not want to invest time in or pay the opportunity costs of collecting NTFPs, because they can earn more money elsewhere, compared to the revenues of collecting forest produce. The money so earned can then be used to buy NTFPs for a part of the sum and use the rest to purchase other things needed for the household. This is a rather rational possible explanation, and if all people in Teen Mauza would follow this rational line of thinking no one would be involved in the collection of forest produce any more. Obviously, the use or non-use by individuals of the forest for the collection of NTFPs is determined by a plurality of factors, among which the notion of opportunity costs.

Also the notion of opportunity costs as an access mechanism is very much linked to cultural identity. Tribal people, who identify more with the forest and less with wage labour in the nearby cities or towns rather spend a day collecting NTFPs in the forest, whereas non-tribal people perceive their identity as more easily commensurable with wage labour which also in the end brings them more revenue (be it in a non-forest-related way). One could thus argue that non-tribal people do have better access<sup>16</sup> to non-forest-based 'labour opportunities' to use the words of Ribot and Peluso (2003). The crux of the issue thus seems to be that the people with forest-based identities see themselves and are being seen as adapted to forest-based livelihoods, while for those with non-forest based identities it is more appropriate to engage in non-forest-based occupations.

This analysis of my observations pertaining to the ethnicity-centred distribution of the NTFP provision service in Teen Mauza goes against the grain of the conventional wisdom in the field of community-based natural resource use and management, namely that the poorest are relatively the most forest-dependent (Vedeld *et al.* 2007). Specifically, in relation to NTFPs, Neumann and Hirsch (2000: 33) in their report written for CIFOR highlight (referring to e.g. Falconer 1992, Hecht *et al.* 1988, Jodha 1986) that "studies from all tropical regions indicate that it is often the poorest households in rural communities that are most directly dependent on NTFPs". In Teen Mauza, clearly the tribal people of Akhupadar are the most forest-dependent. However, none of the tribal households that we surveyed fell within the lowest welfare stratum, while 40 per cent of these households was actually in the highest welfare stratum. At the same time, 54 per cent of the Lakhapada villagers fell in the lowest welfare stratum, this village clearly being the poorest. Thus while Lakhapada was found to be much poorer, Akhupadar was found to

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<sup>16</sup> With this I mean that for non-tribal people it is culturally more appropriate to make use of wage labour opportunities.

be much more forest-dependent; in Teen Mauza it is definitely not the poorest who are most forest-dependent, and forest-dependence is, in fact, ethnicity-related. The poor tend to work as wage labourers, while they buy forest produce from Akhupadar.

Box 4.2.2: The tribal women and my female colleague.

When my female colleague of the PEFESPA project asks a group of tribal women of Akhupadar if she can join them on their NTFP-collection trip to the forest, their reaction shows that they really don't understand why someone who is so different, a 'city-bred' outsider, would want to do anything like this. One of them answers: "It is not really something for you, you need a lot of skill and strength. We carry very heavy loads" (my colleague later tells me that they as forest-people could not imagine that a person like her could cope with the physicality of NTFP collection in the forest). "When we go there, we do this to our saris to be able to climb the steep hills and deal with the thorny vegetation over there", she says when she ties her sari around her waist high above her knees (this is one of the reasons why men are not supposed to join on such trips). The women explain they usually go all together (between five and ten women) deep into the forest for five or six hours and collect a variety of NTFPs, along with the main objective of Siali leaf collection. After much persistence on her side they shruggingly agree to take my colleague along.

After the trip, my colleague comes back rather exhausted, but excited, as she tells me she managed to carry a heavy head load of fuel wood back from the forest, and shows me some edible tubers she brought back for dinner. The women showed her how to collect and harvest different NTFPs. Especially the digging out of tubers is quite a laborious and physically demanding job, which at the same time requires a profound knowledge and experience-base in order to know where exactly to dig for which tubers. Once located, you need a strong digging stick to get them out; you need to go quite deep to reach all the tubers of one root clump. In general it takes almost half an hour of digging to get them all out. Siali leaves are plucked from the Siali vine, but one needs to really know the forest in order to know where the largest leaves are at what time of the year. In order to keep the leaves within easy reach, the women also trim the vines a little. My colleague reflects that these women really know the forest in a very different way than we will ever know it. Their knowledge of the place not only consists of a painstakingly acquired experience-base of daily practice, but at the same time also is something more subtle, closely related to their very identity as forest-people.

Apart from the distributional differences between the tribal and non-tribal inhabitants of Teen Mauza, an important parameter in the distribution of the ecosystem service of NTFP provision is gender. Generally, as mentioned in the introduction, in tribal communities women and men are on a much more equal footing (Maharatna 1998) than is the case among General Caste men and women. Mitra (2008: 1206) summarizes the higher status of tribal women in India as follows: there is no occupational segregation between tribal men and women (in principle women are allowed to be engaged in the same work as men), there is more decision space with regards to marriage (tribal women get married later on average), divorce and fertility and "a hierarchical family structure with women placed in the lowest rung of the social order", present in many patriarchal Hindu caste communities, has been absent from most tribal communities. Yadama *et al.* (1997) point out that the higher status of women in tribal communities is causally related to their contribution to the household income through the collection and sale of NTFPs.

Also in Teen Mauza, this general pattern is clearly visible. The women of Akhupadar are the main collectors of NTFPs, especially of Siali, tubers and mushrooms. At the same time, a maximum of only 4% of the women of non-tribal households are involved in NTFP collection (in this case of mushrooms). In Teen Mauza the general consensus is that if a General Caste family is relatively well-off, the women of this family can perform their traditional roles and thus will spend the major part of their lives in and around their houses. Arguably, this does not only hold for Hindu society, but for a large part of traditional rural life in general. If the financial situation of the household is less stable, it forces the women to engage more in income generation activities outside of their houses, thereby disrupting the traditional gender roles (pers. com. Sudarsan Pradhan<sup>17</sup>). This also means that households that have a lot of their women engaged in outside activities will have a lower status than those who can afford to respect the traditional ideas about gender division.

The use of NTFPs is thus embedded in existing social relations and gender division in Teen Mauza, which leads to the situation that this ecosystem service is not directly available for the majority of the women in the community.

### *Synopsis*

In this thesis I formulated two research questions on the use of NTFPs in Teen Mauza, namely 1) how is the NTFP provision ecosystem service distributed among different user groups in Teen Mauza, and 2) what access mechanisms are used to gain access to NTFP provision and how is NTFP provision embedded in existing social and power relations between different user groups. The section above shows how the use of the main NTFPs of Siali leaves, edible tubers and mushrooms is distributed in a very unequal way among two user groups, tribal and non-tribal inhabitants of Teen Mauza. Siali leaves for the making of leaf plates are only being collected by the tribal people of Akhupadar, who earn an average amount of Rs.7,350 per year with this livelihood activity. Edible tubers and mushrooms are also being collected by non-tribal households (42% and 50% respectively), but both on a per household basis, and in absolute terms the tribal households are making much more use of this ecosystem service (the latter use 90% of the total 'tuber provision' service and 68% of the 'mushroom provision service' used in Teen Mauza). Another important observation is that only tribal women are to a large extent involved in the collection, processing and sale of NTFPs, while only 4% of the General Caste households reported any degree of participation by women.

When addressing why this ecosystem service is unequally being distributed among the two groups and between the genders, and especially how this unequal distribution relates to access, social and power relations, two conclusions can be made. First, ethnicity plays a very important role as an access mechanism to NTFP collection. The social status of the tribal people is tightly interwoven with the forest ecosystem. Therefore they see themselves and are being seen as having a birth right for forest produce collection and sale. This same phenomenon of ethnic identity forms an access barrier to many non-tribal households, especially when it comes to the collection of Siali leaves: they feel it is not appropriate for them to be too much forest-

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<sup>17</sup> Sudarsan Pradhan worked for me as a translator during my field work in Teen Mauza. Because he is from a village close to Teen Mauza, he himself became an important informant pertaining to the organization of daily life in the area.



dependent. Second, my analysis has shown that, while the relatively well-off tribal people of Akhupadar are able to derive quite some extra income from the forest ecosystem, the poorest community members of Teen Mauza do not make use of this opportunity. This runs counter to the conventional wisdom in the literature that the poorest people are the most forest-dependent.

#### **4.3 Distribution of and access to the bamboo provision ecosystem service**

In Teen Mauza, 29% of the houses were classified as being for a large part bamboo-based. Besides, bamboo is being used as roofing material in many of the other community members' housing. Green bamboo is also being collected for the weaving of baskets which is a very popular activity in the agricultural lean season, and forms a livelihood for the artisanal Scheduled Caste basket-makers. Altogether, 75% of the households in Teen Mauza reported to collect at least some poles of bamboo.

There are three important user groups in Teen Mauza regarding the use of the bamboo provision ecosystem service: tribal people, non-tribal residents and non-Teen Mauza Scheduled Caste artisanal basket weavers. The tribal households of Teen Mauza on average use more bamboo than the non-tribal ones: 2.3 bundles, compared to 1.3 bundles for the latter. Together they use about 107 bundles of bamboo annually. The latter group of Scheduled Caste basket weavers has been included, because they have been illicitly using the Teen Mauza forest as an important resource base for bamboo over the last 25 years, although at present their access to the area is rather limited. Both officially and customarily they neither have had the right to use bamboo from the area nor from any of the other surrounding forests, but have been able to derive benefits anyway through illicit harvesting. When looking at the total use of bamboo from Teen Mauza community forest by all beneficiaries, a large part of this has at times been appropriated by these people.

The table (4.3.1) below has been made based on the hypothetical scenario that the Scheduled Caste people would be getting all their bamboo from the Teen Mauza forest. Although my fieldwork does not support this hypothesis, I have decided to include it in the analysis in order to be able to show the difference in order of magnitude between the two Teen Mauza groups who use bamboo for household consumption only, and the Scheduled Caste people who depend on it for their livelihoods through the sale of baskets. Currently, these basket makers are monthly earning between Rs. 2500,- and 3000,- per household with the sale of baskets (while the minimum monthly wage is around Rs. 4500,-). The table shows that this comes down to a use of about 4 bundles of bamboo per household per month. With a total of 10 households in their hamlet, their bamboo use is around 480 bundles per year. This use is in absolute terms, looking at the total flow of the ecosystem service, about 4.5 times as high as the bamboo consumption of all residents of Teen Mauza combined. As I calculated in Annex C, Teen Mauza community forest in principle is ecologically able to also sustainably provide the Scheduled Caste people with the bamboo they need, which is another reason to include them as a user group in this analysis: inclusion, although socially impossible, seems to be ecologically feasible. This assessment is based on some rather coarse back-of-the-envelope-type calculations, but was done to get an idea of the sustainability of this potential harvest, and thus also of the sustainability of the current harvesting levels.

It should be noted that the forest protection committee has set an annual quatum of bamboo in Teen Mauza of two bundles per household, which restricts the community members in their use of the bamboo provision service. These two bundles are to be used strictly for household

use only and are not allowed to be used for sale in any way (also not indirectly through the sale of bamboo derivatives such as baskets). It is thus to be expected that community members will not report any significant use beyond the allowed community quatum, as this could bring them in trouble. The reported use of bamboo in the household survey is thus a conservative estimate. Also, some households do buy, or collect additional bundles of bamboo from outside Teen Mauza area. The magnitude of this bamboo use, however, is not known, as this topic lies outside the scope of this study and has thus not been covered in the household survey.

Table 4.3.1: The distribution of bamboo among user groups

	Tribal people Akhupadar	Basantpur and Lakhapada residents	SC basket makers <sup>^</sup>
Number of HH in Teen Mauza	15	61	10
Reported average use of bamboo/HH/year	2.3 bundles*	1.3 bundles	48 bundles
Total yearly bamboo use (percentage of total) <sup>#</sup>	32.4 bundles (5%)	74.5 bundles (13%)	480 bundles (82%)

\* One bundle consists of 12-15 poles of bamboo

<sup>^</sup> These people are not part of the forest protection community, but do collect part of their bamboo illicitly from Teen Mauza area, this column is added for reasons of comparison: supposing that they would be part of any protection community, how much of the bamboo provisioning service would they use

<sup>#</sup> Corrected for a 6% non-Teen Mauza collection

The Akhupadar tribal people also earn some subsidiary income through the sale of bundles of green bamboo to those Teen Mauza residents who are not able to collect it themselves :13% of the inhabitants of Teen Mauza reports to buy their bamboo in Akhupadar instead of collecting it themselves. Another 3% buys it from outside Teen Mauza only (the reported price per bundle ranges between Rs. 140,- and 200,-). A total of 6% of the Teen Mauza inhabitants reports to *collect* all of their bamboo from outside Teen Mauza. For this reason the total Teen Mauza bamboo use has been diminished with 6% in the table.

#### **Access mechanisms and power relations: bamboo needs, bamboo rights and illicit harvesting**

In principle, all the people within Teen Mauza have the same rights to the harvesting and use of green bamboo, namely to a maximum of two bundles of bamboo per year. In practice however, there is a small difference in the use made of this quatum between the tribal and non-tribal inhabitants of Teen Mauza. In terms of access the main difference between the two user groups is their distance to the forest: the forest starts right adjacent to Akhupadar village, but the villagers of the other two villages at least have to walk 1 and 2 kilometres respectively. While this may play a small role in the distribution of the bamboo provision service, the main factor in this distribution is probably a difference in bamboo needs between the two groups.

In Akhupadar, a rather traditional village, about 70% of the people is living in a house that for a large part consists of bamboo, and most of the houses also have large sheds or animal stables that are almost completely made out of bamboo. Comparatively this use of bamboo for housing is a lot less in Basantpur and Lakhapada. Hence, in this case it is not a difference in the

*ability to make use of* the benefits of the bamboo provision service that explains the differences in the use levels of the two user groups.

For the use of bamboo for the making of baskets, the situation is slightly different. In this case access is limited for those families in Lakhapada who depend on non-agricultural wage labour for their livelihoods, as they have a lot less time for the making of baskets, which is mostly done by peasants in the agricultural lean season when there is not much to do on their land. Most of the peasant households earn and produce enough for subsistence in the eight months that there is a lot of work on their fields. The lean season provides them with a break (although they may have to lessen their daily intake of food) (Mishra 2007), while wage labourers have to work almost all year round to feed their families.

In the whole Ranpur region it is generally the case that for bamboo, and this also holds for the collection of fuel wood, the main access determinants are not intra-communal, but function on an inter-community basis. This means that in general all the people within one protection community roughly have the same access, and that access thus is determined by whether one is considered part of the community or not. As explained in the background section on Teen Mauza, there is a very direct relationship between the protection area and community, and the collection of bamboo and fuel wood. The large majority of all the villagers collect their bamboo and fuel wood from their own community forests and collection of these resources by outsiders is considered a violation of the CFM rules. As almost all villages have had access to some forest since the 1980-90s, one would say that this one-to-one relationship grants everyone access to these resources. However, the situation has not remained static since the onset of CFM on a landscape scale and the region has seen many immigrants who have come from outside the region or have moved from one community to another ever since. Because they are seen as free-riders by the protecting communities, these people are currently falling outside the system altogether.

This exactly is the case in Lakhapada village where ever since they started protecting the village forest from outsiders in 1985, the number of residents of the village has almost doubled from 39 to 75 households. However, none of these new families has been allowed to join the forest protection committee, because the instigators of this committee want them to pay an 'entrance fee', in order to compensate for their foregone protection efforts. Especially in the beginning, they argue for several years the protection cost a lot of effort, while there was nothing yet to be harvested. Many of the new residents stated that the fee they are asking of them is so high that they can impossibly afford it (mostly an amount of Rs. 5000-10,000,- is mentioned, which is equal to 1-2 minimum-wage month salaries). For this reason, the main access issues and power relations pertaining to the bamboo provisioning service in Teen Mauza are related to the politics of who is in and who is out of the protection system, or of who has the right to call himself a community member and use the forest's resources and who has not. Hence, for these people, using the *Theory of Access*, it is either rights-based mechanisms in the form of becoming an official community member by payment of the required fee, or what the authors call "illicit mechanisms", that can grant them access to bamboo.

Since the bamboo-dependent Scheduled Caste people do not have the means to afford rights-based access, they have taken to illicit access mechanisms. Through these mechanisms they have at times been able to use quite a substantial part of the bamboo provision ecosystem service of Teen Mauza. Hence, I decided to include them as a user group in the distributional analysis of bamboo used in Teen Mauza. Thus, while the differentiation of access between the beneficiaries of Teen Mauza community forest to all the other ecosystem services provided by the forest is mostly caused by "structural and relational mechanisms of access" (e.g. "access to

technology, capital, markets, labour, knowledge, authority, identities, and social relations”), when it comes to access to bamboo it chiefly are ‘rights-based’ and ‘illicit mechanisms’ that determine the distribution of this service (Ribot and Peluso 2003: 162).

The Scheduled Caste people which I included in Table 4.3.1 as the third user group, are seen as one of the immigrant communities by the inhabitants of Lakhapada. These people live in a small 10-household (80 people in total) hamlet just outside Lakhapada, on the main road to Ranpur town. According to some of the residents, this hamlet was established approximately 25 years ago by migrants from Basudia, who had to find a new place to live because of a general lack of space for family expansion over there and a conflict between families.

Traditionally, the dominant livelihood of these people has been basketry: making baskets by splitting poles of fresh, green bamboo found in the surrounding forests into small slivers which are subsequently woven together. Residents of this hamlet reported that when they came, bamboo was easily accessible, as most the forests were loosely controlled by the local branch of the Forest Department. Since, the Forest Department staff was not interested in bamboo, the payment of small bribes every now and then to the local Forest Guard was enough to gain access to as much bamboo as they wanted. In the late 1980’s and throughout the 1990’s an increasing number of communities started to protect the forest they had traditionally depended on for a large part of their subsistence and livelihood. In this process the Scheduled Caste basket-weaving people were never involved and they were effectively excluded from all forest-protecting communities. Because this community protection was much tighter (an less bribe-prone) than the Forest Department’s protection, the Scheduled Caste people’s access to bamboo got more and more problematic over the years. Every once in a while, like for instance during the inter-village conflict between Basantpur and Akhupadar, they would regain access to patches of forest left unprotected due to the conflict. One of the residents told me that currently, however, the situation is so hard for them, that they are on such bad terms with most of the surrounding communities, that he and many of his fellow bamboo-dependent artisans are on the point of having to leave the area for a big city, to find work over there as a sweeper, or earn their money through begging in the streets.

*Box 4.3.2: Illicit harvesting of bamboo by the Scheduled Tribes people*

One sunny afternoon, three men with a bundle of bamboo tied between their legs to the frame of their bicycles pass close to Basantpur village on the main road to Ranpur, their machetes attached to the handle bars. I quickly pull out my camera and make a photo, while pointing out to my translator what I am seeing. One of the men looks back at me and I see fear and distress in his eyes. The men pick up speed and continue behind the bend in the road in the direction of Lakhapada, anxiously looking back over their shoulders. I think to myself: this bamboo is probably stolen from the neighbouring forest. Later I realize that these men were some of the men of the Scheduled Caste hamlet near Lakhapada. When, later that afternoon, we arrive at their place we see the three bundles of bamboo. Upon asking one of the men where they got the bamboo from, he answers that they went to Kalamatia JFM forest about ten kilometres down the road. They were caught by some of the local community members, but managed to talk themselves out of the situation, explaining their desperate position, having no money to feed their families and being completely dependent on bamboo. However, he adds that they were threatened that in case they will come back they will be severely punished. He also tells me that in Teen Mauza only he has already been fined between 50 and 60 times in total for taking bamboo from the community forest (each of these fines between Rs. 50 and 100). Several times they also seized his machete, he says, and reported him to the Forest Department, who arrested him and subjected him to severe beatings and imprisonment. He emphasizes that every time he was released he had no choice but to continue with his traditional occupation, trying to get bamboo from yet another one of the neighbouring patches of forest, because he really has no other viable livelihood alternative.

Just as the other mostly General Caste immigrants who are actually living on Lakhapada village land, the Scheduled Caste people, who are living very close to Lakhapada along the main road, have been excluded from the resource use of the village's forest. Also, none of the other surrounding communities such as Areda, and Basudia has involved these people in their protection systems. There are, however, more reasons why these SC people have been left out of all of the CFM initiatives in the area: not only did they arrive later than the forest protection started, also they are using bamboo to make baskets for sale, while the forest protection committees by default allow use for household consumption only. Also, in the social hierarchy of rural Odisha, the Scheduled people have a very low status.

The basket-weaving people, I have been referring to here, have traditionally been seen as night soil workers, and therefore always have been considered dirty. Many a time community members narrated that even the few Scheduled Caste people that were included in community forest management in one of the forest-protecting communities in the Ranpur area, were not allowed to sit with the other community members at general member meetings. No one in the surrounding communities would accept a glass of water or food from these people, not even the Scheduled Tribes people, who in many other places in India rank lower than the Scheduled Caste people. Surely, their place at the bottom of the local social hierarchy has contributed to the active exclusion of these people by all surrounding communities. Thus, while access to the community-protected forests is already steeped in the issue of who is considered an autochthone and who an immigrant who came to profit from the community's efforts over the years, even more access barriers are found on the path of the Scheduled Tribe people (many people do not even want them to live anywhere close to their place). In essence, all of the above described access barriers pertain to the political process of who is considered to have the right to use the resources from the Teen Mauza forest.

De facto, these community-initiated and -controlled forest protection systems have over the years resulted in the stigmatization of many inhabitants of the area as encroachers. Within this groups of people the Scheduled Caste people have especially been affected as their livelihoods have traditionally been totally forest ecosystem-based. Hence, in order to continue their traditional occupation and their only viable livelihood means at present, the Scheduled Caste people from the near-Lakhapada hamlet on a daily basis have to run the risk of being fined and retributed by local forest-protecting communities, or worse, punished and imprisoned by the Forest Department.

### *Synopsis*

For the ecosystem service of bamboo provision in Teen Mauza I formulated two research questions: 1) how is the bamboo provision ecosystem service distributed among different user groups in Teen Mauza, and 2) what access mechanisms are used to gain access to bamboo provision and how is bamboo provision embedded in existing social and power relations between different user groups? Addressing these questions, in this section I have elucidated how bamboo use is being distributed in Teen Mauza showing that within the current protection community there is not that much of a difference in the use levels of the two user groups. There is, however, a big difference between the bamboo use of these two groups and that of the third user group, the latter being about 4.5 times larger. The use level of this third user group comprised of the Scheduled Caste basket-makers of near-Lakhapada is hypothetical, though, hypothesizing that they are getting all their bamboo from Teen Mauza, for matters of comparison. Since these people

have not gotten access to any of the community forests, they have been illicitly harvesting the bamboo they critically depend on for their livelihood of selling bamboo baskets. For this, Teen Mauza forest has always been an important resource base. Hence, the Scheduled Caste basket-makers form an important, but illegitimate user group.

Using the *Theory of Access* to shed a light on the found distribution, I showed that the small difference in use level between the tribal and non-tribal inhabitants of Teen Mauza cannot be explained in terms of a difference in access, but is probably related to a difference in bamboo needs. In the tribal village of Akhupadar much more bamboo is being used as building material. When looking at the difference in the use of bamboo between these two groups and the Scheduled Caste basket-makers, there *is* a difference in access: the latter group does not have usufruct rights to any of the resources in Teen Mauza forest, just as all the other immigrants who have come to Teen Mauza in the last decades. If any of these people want to gain access to bamboo from the community's forest they have two options: either pay a large sum of money to become an 'official member' of the community, or try to illicitly harvest it and run the risk of being fined and ostracized.

The Scheduled Caste people have chosen the second option and have taken to 'illicit mechanisms' to gain access to the bamboo of Teen Mauza and other community forests (Ribot and Peluso 2003). Most of the other immigrants people collect their fuel wood from somewhere else and choose to buy their bamboo from outside if they need it. However, they do not depend on bamboo for their livelihoods. Also, some of these other migrants, because of their higher social status, have been a little more accepted in the community and are able to, for instance collect fuel wood from the foothills of the community forest. This does not hold for the low-ranking Scheduled Caste basket-makers and since they have no other livelihood options, they say they have no choice but to continue with the illicit harvesting of bamboo from the community forests of Ranpur. Doing so, they run the risk of being fined by the communities (they say they already had to pay numerous fines) or even being arrested and locked up by the Forest Department if reported (also this already has happened to some of their community's men several times). Over the years, while an increasing number of village communities have appropriated and started protecting forest of their own, the situation of the Scheduled Caste people has become to be increasingly untenable. At the moment, they are on bad terms with most of the surrounding communities and are living the lives of social outcasts. Many of these people have reported that if their situation remains unchanged they are forced to leave behind both their hamlet in Lakhapada and their traditional occupation of basket-weaving.

#### **4.4 Distribution of and access to the goat grazing fodder provision ecosystem service**

In Odisha, livestock forms a paramount part of rural life: 80 percent of the rural households own one head of livestock or more for the provision of milk, meat, eggs, manure and draught power (Department of FARD nd). Pertaining to small ruminants, over 87 per cent of all goats and sheep in the state are owned by smallholders and landless people (Kornel *et al.* nd). Goat rearing for meat production forms an important complementary income source for the rural poor in Odisha as it requires very little input other than labour. Mostly, it implies the grazing of herds of goats on village fields and in forest areas surrounding villages without feeding them with any supplementary food (Nandi *et al.* 2011). When they reach maturity surplus goats are usually sold for their meat at local markets where the demand for goat meat has been on the rise over the last years (Kornel *et al.* n.d.).

In Teen Mauza, 69 per cent of the people own one head of livestock or more, but only some 7 households out of the 76 participating in forest protection own goats. The goats kept by most of the people are of the Black Bangal type, a small and stocky goat variety that is known to have a high fertility (Lundholm 1976) and is highly adapted to the hot and dry climate (Kornel *et al.* n.d.).

Although all the graziers in the community and the surrounding area are sedentary (both herders and goats always return to their villages at night), goat grazing requires adopting a (semi)pastoralist lifestyle, being with the goats in the fields and forests for at least 6-7 hours of daily herding, all year long. As the understory of the community forests is very densely populated with thorny bushes, shrubs and climbers and graziers do not stick to the few walking paths that are available, and the forest area are located on steep hills, the general consensus in the community is that goat grazing is a tough occupation.

In Teen Mauza the ecosystem service of ‘fodder provision’ (see e.g. Egoh *et al.* 2010) is distributed among and within three user groups: community graziers, graziers from neighbouring communities, and a town-based ‘absentee herd owner’ (after Little’s (1985) connotation of the word). It should be noted that the socio-economic differences between and within the two former groups of graziers are much less than between these two groups and the ‘absentee’ grazer. All of the Teen Mauza graziers fall in the same welfare stratum and have comparable landholdings. While the welfare status of the graziers of neighbouring communities is unknown, I assumed on the basis of herd size and grazing behaviour that differences between these and the goat grazing families of Teen Mauza are marginal.

Table 4.4.1 features all the graziers falling within these three user groups who are making use of the different grazing areas (Teen Mauza CFM area and village land, other communities’ CFM/JFM areas, and unprotected Reserve Forest) along with the respective grazing intensities of their herds. Also, the total use made of the fodder provision service of Teen Mauza CFM and village land by the three groups is shown.

Remarkably, non-community graziers are making more than 5.5 times more use of the fodder provision service in Teen Mauza CFM than those who are part of the forest protection community, the ‘rightful beneficiaries’ of the service. Ajay Das, an ‘absentee’ grazer and commercial agricultural entrepreneur, who is not in any way part of the traditional, local grazing system is appropriating 57 percent of the grazing services of the community forest of Teen Mauza.

For the goat grazing days on Teen Mauza village land the situation is different, as in this case some 49% of the fodder provision service is being used by Teen Mauza residents, while graziers from neighbouring communities and Ajay Das use 17% and 34% of this service respectively. This indicates that the Teen Mauza goat graziers tend to graze their goats more on the village lands than in the CFM area. An important question to be answered in this section is: why does this occur?

The table also shows that, although I did not encounter any graziers from Areda village in the area, their patch is intensively being used by graziers from the surrounding communities of Teen Mauza and Basudia and Ajay Das’s herd. Just as in the case of Teen Mauza CFM, outsiders seem to make more use of the Areda community forest than the community members themselves. It can thus be derived from the table that the traditional, reciprocal grazing system is currently not well-balanced in the study area.

What should be noted, is that the numbers in the table are based on observations, participant observation and interviews done during a two-week period in the dry, winter season of January.



In the wet season, the grazing situation is very different, as the majority of the fields (referred to as village lands in the table) will then be used for cultivation, and grazing will thus be more forest-based. Also, the numbers might not indicate very reliable averages of the grazing situation in the dry season, as much of information on the grazing activities is secondary information gotten from graziers while speaking about their average grazing activities and patterns (it was not feasible to go out grazing with all of them). Also, some of the numbers in the table, especially those related to graziers from neighbouring communities, are based on estimations and extrapolations. For instance, if they graze their goats in the Dasa Mauza and Teen Mauza forests, they also will cross over Teen Mauza village land for an equal number of goat.days. In this way I partitioned the number of goat.days of grazing of the different graziers between the different grazing grounds, making an estimation (based on my observations, extrapolated where necessary) of how long they actually stay in the forest on grazing days and how much time they spend on the village planes. Nevertheless, the table gives a very useful indication of the relative use of the fodder provisioning service of the area by the three user groups and denotes the general tendencies. The main point here is that fodder provisioning is distributed unequally among and within the user groups, and that the forest-protection community makes a lot less use of the CFM patch's fodder provision than the graziers from elsewhere.

While the main focus is on the fodder provision service of the CFM area, I have included the grazing activities on the Teen Mauza village land in my inquiry to put the former into perspective, so it can be seen in light of the larger picture of grazing activities in the area. This also exposes the role that the availability of labour plays in the distribution of grazing activities between the village lands and the forest. It shows that those who have more access to labour (all of which are non-Teen Mauza graziers) can make more use of the grazing resources of the less accessible and densely vegetated forest hills.

As shown in Table 4.4.1, there are three community graziers in Teen Mauza: Sunil, Renu, and Praphula, with herds of 50, 50 and 30 goats respectively. Apart from Renu, they all graze their herd inside the community's forest for some days a week. The latter two also frequently visit the JFM area of Areda village, where they mostly graze the lower hillside and plantation lands of the forest area. Geographically, Areda's forest is much closer to Lakhapada - the place of residence of both Renu and Praphula - than the CFM area, which plays an important role in their preference for that grazing area. Renu specifically mentioned this as a reason for her grazing over there. On the other hand, the CFM area is very close to Akhupadar where Sunil lives, and he does not graze his animals over at Areda's forest. The proximity of a certain grazing area thus is an important reason for the community graziers to taking it up in their regular grazing routes.

Table 4.4.1: Distribution of grazing ecosystem service amongst graziers of Teen Mauza

	Community graziers			Graziers from neighbouring communities			Absentee grazier	
	Sunil	Renu	Praphula	Dasa mauza	Balabadrapur^	Basudia (Sanjay)	Ajay	Ajay (young goats)
Number of goats	50	50	30	55	50	30	200	35
Goat.days* of grazing in Teen Mauza CFM area	75	-	75	165	75	45	500	70
Goat.days* of grazing on Teen Mauza village land	275	250	105	55	at least 50	120	300	at least 140
Goat.days* of grazing in other communities' CFM/JFM area	-	100 (Areda)	30 (Areda)	165 (Dasa Mauza)	at least 75 (Dasa Mauza)	45 (Areda, Basudia)	200 (Areda, Basudia, Dasa Mauza)	35 (Basudia)
Goat.days* of grazing in un-protected Reserve forest	-	-	-	-	-	-	400	-
<b>Total goat.days on Teen Mauza village land</b>	<b>630 (49%)</b>			<b>225 (17%)</b>			<b>440 (34%)</b>	
<b>Total goat.days in Teen Mauza CFM</b>	<b>150 (15%)</b>			<b>285 (28%)</b>			<b>570 (57%)</b>	

\*Goat.days is a unit for grazing intensity: number of goats multiplied by the number of grazing days per week

^ Does not count up to a total of 350 goat.days, because not all grazing activities of this grazier are known

Sunil grazes his goats daily on the village lands of his village Akhupadar. About two times a week, one of his parents accompanies him so that together they can take the goats into the densely vegetated CFM area. Since, as I observed, they don't spend the whole day in the CFM area, I have counted these as 1.5 goat.days in the table. The Akhupadar village lands are much more expansive than those of the other two villages. The total area of Akhupadar according to the cadastral map is 404 acres, of which only some 200 acres are being used for agriculture or housing. All the rest is made up of plantation land (mostly of eucalypt), foothill shrubland (a continuation of the vegetation on the forested hillside), traditional community grazing fields (currently heavily eroded), and fallow agricultural land. Basantpur and Lakhapada do not have such extensive shrub- grazing and fallow lands. On paper all this land once belonged to Akhupadar village, but many of the agricultural fields and plantation lands have over the course of years been sold to villagers of Basantpur and Lakhapada and other surrounding communities. When it comes to grazing by non-Akhupadar residents, especially cow owners of Basantpur and Basudia take their cows out grazing on Akhupadar land, while from the goat herd owners only Praphula visits the area frequently.

Renu is the only female grazier of Teen Mauza and besides her there only is one other female grazier who grazes in Teen Mauza but lives in Dasa Mauza. Female graziers are very rare among the General Caste Hindu people, as traditional household role patterns prescribe women, and especially married women of reproductive age, to stay inside the family house to take care of their domestic tasks. In fact, as mentioned in the previous chapters, if women do work outside the

family's house, it is seen in the community as an indicator of poverty, forcing the women to abandon their traditionally assigned duties. Renu is a divorcee of a stranded marriage, which forced her to return to her parental household in Lakhapada (women always leave the family upon marriage, while men stay in their family's household). As divorces are extremely rare and very much taboo in Hindu culture, Renu probably will not be able to remarry and now forms an extra burden for her family. It is for this reason that she has been put to graze goats for her family.

This female grazier mostly grazes her 50-head herd on the lower hillside of the Areda and Lakhapada forests, on the northern side of the main road leading to Ranpur town and the Lakhapada village land plantations on the south side of the road. A few times per week on average, she also visits the Basantpur village forest while circumventing the forested hillock between the three villages of Akhupadar, Basantpur, and Lakhapada, going a bit higher up the forested hills (see Figure 4.1.1). At times, her mother comes over to help her with the goats and to stand in solidarity with her daughter.

Praphula also is a Lakhapada resident who grazes his goat herd on a daily basis. Sometimes his son takes over his duty, so he can take a day off. Praphula was mostly seen out in the fields of Lakhapada village, where he was grazing his goats on the stubble of the harvested rice crop. Some three times a week, Praphula takes his goats over the hill to the Akhupadar village land and the Teen Mauza CFM area and about the same number of days he partly spends in the Areda forest.

The grazing routes of the non-Teen Mauza-based graziers have been less well documented, since I have only followed their moves while they were on Teen Mauza land and do not know much about their grazing routes beyond Teen Mauza. The higher uncertainty as to their grazing patterns is shown in the table by 'at least .... goat.days', meaning that it could be more, but it is highly likely to be not much less, than the number indicated.

The two grazier couples from Dasa Mauza graze some 105 goats in the Teen Mauza CFM area and the village lands that are adjacent to the Dasa Mauza forest. While their main grazing areas are on their own community's lands, there is a substantial spill-over of their grazing activities to Teen Mauza. As mentioned previously, traditionally graziers have never been very rigid when it comes to boundaries and their grazing over at Teen Mauza's lands should be interpreted in this light. Both these graziers stressed that no one ever had any objections against their grazing activities on other community's lands.

Apart from the Dasa Mauza graziers, also Sanjay of Basudia village comes to Teen Mauza for the grazing of his 30 goats. He prefers the grazing areas of Areda and Lakhapada by the side of the main road, roughly overlapping with the grazing route of Renu. However, additionally, he also visits the Teen Mauza and Basudia community forests some two times a week, and he says he goes higher up the forested hills than Renu does. It seems that since the Areda and Lakhapada forests are closer to his village, he prefers to graze his goats there above taking them all the way to Basudia's forest patch on the other side of the Akhupadar valley.

The Teen Mauza forest and village land is also playing an important role for the grazing of Ajay Das' herd, who started grazing goats as a supplementary income-generating activity about 2.5 years ago. Ajay Das is a commercial agricultural entrepreneur who lives in the nearby administrative capital of Ranpur. His diversified livelihood strategy of irrigated farming, animal rearing and goat grazing, while not being based in the area but in the nearby town corresponds with what Little (1985) coined "absentee herd owners", with "sedentary businessmen" as a separate subcategory of the former. As Little (1985) observed in Northern Kenya, these

businessmen often combine retail business, irrigated agriculture, and pastoral activities in a strategy of economic diversification.

In the case of Teen Mauza, Ajay Das is much more affluent than any of the villagers of Teen Mauza and its surrounding communities, owning some 35 acres of high input, drip-irrigated agricultural land in the Akhupadar area, on the far-end of the Akhupadar valley. He is permanently employing about 15 farm staff, and besides his horticultural work, he owns some 6000 broiler chickens, 30 dairy cows, and 235 goats. Given this number, it is unsurprising that he is appropriating some 57 per cent of the grazing ecosystem service of the Teen Mauza CFM area (see Table 4.4.1).

He is permanently employing two specialized herders for taking his 200 adult goats deep into and high up the slopes of the surrounding forests for grazing. De facto, about three days a week he has his goats grazed in the Teen Mauza CFM area (I have counted these as 2.5 full goat.days)<sup>18</sup>. Since his herd is based on Akhupadar land and he is always crossing over this land to reach the other grazing areas, Ajay's herd spends quite some time grazing the Teen Mauza village lands: averagely about 1.5 full goat.days a week). Apart from Teen Mauza, the herd also frequently visits the other forests flanking the Akhupadar valley, namely Areda, Basudia, and Dasa Mauza community forests, and the forest which are currently not being protected by any communities, closer to Ranpur town.

Ajay is employing a third herder to take care of the young goats born throughout the year: he explained that on average one young goat is born per goat in the herd per year, meaning an annual output of 200 offspring. With an average per-head farm-gate price of Rs. 2000,- to 3000,-, goat grazing represents a lucrative supplementary income source for Ajay Das.

The first couple of months of their lives the juvenile goats are taken in a separate small herd, where during the day they are taken out grazing by one extra specialized herder. At the moment of my fieldwork there were between 30 and 35 young goats with this herder, who also makes sure they are being fed milk in the mornings and afternoons. Most of the time, this herder stays on the shrubland around the farm, which officially is part of Akhupadar, but borders the Basudia CFM area. About three days a week on average, he also takes the young goats for grazing on the lower reaches of the Teen Mauza, and Basudia CFM areas.

The per-head grazing impact of the herd of young goats on the forest is larger than that of the adult herd, because in order to make the tender leaves the juvenile goats need available to them, the herders cut off branches of trees. These they leave on the forest floor for the little goats to graze on. According to some people of the Teen Mauza community, they sometimes also unnecessarily cut-off larger branches or whole tree stems, but that is being denied by Ajay Das and the herders.

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<sup>18</sup> Ajay's goats are being grazed everyday, but as his property borders various community and non-community forests, he spreads the grazing pressure of his herd over all of these forest within a radius of 5 km from his property. The Teen Mauza community forest is included in this radius, but on average, they only visit it three days a week.

#### *Box 4.4.1: Specialists at braving thorns and leopards*

One of the specialist herders of Ajay Das, wearily tells us that goat herding is a very strenuous job. They discourage us to join them on a grazing trip, because they say, people who are not trained as herders will find it unbearable to deal with the impenetrable understory, full with thorns of up to several centimeters, and to run the risk to encounter hungry leopards on the way. These graziers are from a specialized grazing caste, called Gola, which originally came from Andra Pradesh but migrated northwards more than a century ago as the grazing lands expanded in Odisha. They still speak a special dialect of Telegu, the language of Andra Pradesh. The occupation and livelihood specialization of grazing in this caste is heredity (as is the case with caste in general), being passed on from father to son. Ajay's grazier has been with goats since the age of 5 and never has had any formal education.

One day, when one of the specialized graziers has taken leave, a stand-in herder takes over his duty. That day the one Gola herder who is left, tells us he will not move into the forest, because he does not trust the skills of this "Odhia" grazier, especially now they had seen a leopard in the morning in the foothills of the forest. He tells us that this ordinary "Odhia" grazier is not experienced enough to keep leopards at bay in the forest. Clearly, he profiles himself as a specialized grazier with all the necessary experience, while he stresses that all the "normal" herders of Odisha can never reach the same level of proficiency.

For the same reason Ajay Das has specifically employed Gola herders for his goats, because he knows that they can very well keep the herd together in the harsh conditions of the forest (the thorny vegetation leaves its marks on the herders' skins), and are able to recognize all the individual goats of the 200 head herd, being able to notice it immediately when a goat goes missing, or when one has fallen ill. Also, thanks to his graziers, Ajay Das says, only two goats have been taken by leopards in the last 2.5 years, while all the other herds have had higher losses.

There is no evidence of any coordination of grazing activities among the different users of the ecosystem service of fodder provision: none of the graziers and herders that I spoke with in the field ever mentioned any systematic planning. There seem to be no areas or routes specifically designated to any of the graziers in the area, although in an organic way all of them have found their own grazing patterns. In the end, there also hardly are any incentives for strict coordination among graziers. First of all, in Teen Mauza and the surrounding communities, there are no rules pertaining to special grazing areas, meaning that grazing is allowed everywhere. Moreover, there are no restrictions for outsiders aspiring to use the resources of the communities' forests. Secondly, and partly as a result of this, the potential grazing area is so large that I often faced difficulties to find any of the graziers. Also, many of the graziers told me that it is not a problem when they meet one another and the herds intermingle; I noticed that many of the graziers are friendly with each other and do stop and talk when they happen to meet.

#### *Boundaries and reciprocal community grazing systems*

When it comes to grazing, village and community forests boundaries in the Ranpur area have been rather flexible and fuzzy. By nature, grazing is an activity that cannot be easily bounded, as graziers have to spread grazing pressure, moving through the forest with sufficient speed to allow the shrubs to regenerate. In general, grazing in the area seems to be based on reciprocity between neighbouring communities: everybody using neighbouring community forests, but at the same time accepting outsiders in their patch.

Such a flexible system would work well if all community members would have access to their own patch of forest, with no people being excluded. However, reality shows that for instance Renu of Teen Mauza does not use her own community forest while she does graze her animals in forest areas of other communities. The same holds for Sanjay from Basudia, who hardly grazes in his own community's patch, but instead uses the Teen Mauza village land and community forest for grazing. Besides, the number of grazing families and goats is not the same in every village, which puts the reciprocity of the system out of balance. For example, Teen Mauza's neighbouring forest protection community, Dasa Mauza consists of ten villages and hamlets and therefore has a much larger number of grazing families. At present, I have observed, that three grazing households with a total of 105 goats frequently visit the Teen Mauza forest, while none of the graziers of Teen Mauza reciprocates this by grazing in the Dasa Mauza patch.

### *Access mechanisms and grazing practices in Teen Mauza*

In this section I use Ribot and Peluso's (2003) notion of access mechanisms (and Blaikie's (1985) access qualifications) to, firstly, explain why grazing is not being used by more households in the community and, secondly, why grazing is distributed as shown in table 4.4.1 among the existing graziers of the area. Also, I use access mechanisms to elucidate how this distribution of grazing is embedded in existing power relations (of access to labour, knowledge, identity) between communities and between community and outside graziers.

In the case of grazing in Teen Mauza, certain specific access qualifications and mechanisms shape who uses the ecosystem service grazing as an 'income opportunity' (Blaikie 1985) and who does not. It is important to realize that in theory every household in the community could choose to make use of this income opportunity, but that the prerequisite access qualifications make it easier for some to make use of it than for others. One of the most important access qualifications is the availability of labour in the household, as goat grazing requires daily herding, year-round. For this reason, some people mentioned that they cannot afford to convert their livelihood to goat grazing. At the same time, the dominant livelihood occupation of agriculture in the form of the cultivation of rice and pulses is a seasonal occupation with a 3-4 months-long lean season, which thus requires less labour investment.

In the study area, although goat rearing can be a rather lucrative livelihood strategy, landholding is a much more important determinant of social status (together with being employed by the government). Therefore, goat grazing is usually done as a supplementary activity besides some agricultural work, as it is culturally very inappropriate to sell all of your land and just become a 'specialized grazing household'. All the grazing families in the community do own some land (1 acre or less), and are indeed doing some agricultural work besides their grazing. In some way, landholding thus functions as an access qualification for grazing in the community.

As most of the graziers only own a part of the goats in their herd, the rest of which they are taking under custody for other households social relations are important too in determining which household can get involved in grazing. Those who are not trusted by the community, for instance *dalits*<sup>19</sup> would have a hard time getting other one's goats under their care. Also, these relations among the existing graziers, determine who has the largest herd and thus uses most of the fodder provision ecosystem service.

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<sup>19</sup> The Hindi word for *Scheduled Caste* people.

Grazing also requires some knowledge of goat rearing, especially when it comes to dealing with the birth and rearing of baby goats. Also, herd owners mentioned that it is important for herders and graziers to be able to recognize all the individual goats and quickly notice any abnormalities about them. Clearly, this knowledge is not something that is impossible to learn for everyone, but it does require a very serious commitment with the grazing occupation (you cannot just do it as a simple subsidiary income-generating activity, such as for instance keeping chickens).

As described in box 4.4.1, for access to the labour opportunity of *employed* herder, ethnicity plays an important role. For this occupation, Gola herders are being preferred over normal 'Odhia' herders. While a large extent of this preference is being based on the general skilfulness of the Gola caste people when it comes to goat herding, the anecdote in box 4.3.1 also shows that Gola people also discursively construct their identity as skilled herders. This they do by actively profiling themselves as goat herder prodigies and downplaying the adeptness of non-Gola herders (one of the Gola graziers told me: "we cannot expect that 'Odhia' herder to be able deal with leopards in the forest").

Related to the above point of ethnicity and its effects on access to grazing, grazing in general seems to be tied to ethnic identity in the area. While some households in the village of Basantpur own up to four goats, none of these are grazing families, and some of their goats are in fact being grazed by Sunil in Akhupadar. All the families in Basantpur are General Caste. More specifically, they are of the 'Odhia Khandayat', or warrior sub-caste (Kshatriya in Hindi), but locally this caste is seen as tied to sedentary agriculture, mostly of rice (Dhal 2003). It would be culturally inappropriate for a Khandayat family to engage in grazing (pers. com. G. Rao, November 2011). In Lakhapada, however, Praphula Parida is of the Khandayat caste, but is engaged in grazing. The reason for this could be that since Lakhapada is a very much mixed village, the 'peer pressure' of fellow Khandayat families is rather small.

Additionally, access to the local market can also be an important access qualification. However, currently the demand for goat meat is much higher than the supply (Kornel *et al.* n.d.) and the conditions in the whole community, being close to the main road and the block's capital are generally favourable to goat rearing (high incidence of 'windfall assets' (Blaikie 1985)).

While the availability of labour is an important access qualification for choosing and getting access to grazing as a livelihood activity in the first place, it also plays an important role in the actual distribution of the ecosystem service of grazing. In general, at least two graziers are needed to safely graze a herd of goats in the thick, thorny and leopard-invested forests, but only few families can afford to spend so much labour on it. This problem can however be circumvented: two graziers from nearby town Ballabdrapur, have combined their forces, and now together graze some 55 goats daily in their community forest and that of Teen Mauza.



#### *Box 4.4.2: Ashok's herd*

Sunil is the 17-year-old son of Ashok Mahapatra and his wife. His family lives in the small tribal village of Akhupadar and owns some twentyfive goats. Besides, they are taking care of another 25 goats from other people in the community. Now his parents are getting older, Sunil is getting more important for the grazing of the family's goats, although he tells us he doesn't like the work and would rather leave his village altogether for big cities like Nagpur and Bangalore to work as a construction worker.

Dressed in only a *dhoti* and a sleeveless shirt, and wielding a small axe he, together with his dog, takes the goats for grazing almost every day between 10-12 in the morning and sunset in the fields and shrubland surrounding their village. Two days a week, one of his parents joins him so they together can take the goats into the forest for grazing. Grazing over here requires more vigilance, as the terrain is steep and the undergrowth thick with thorny shrubs and climbers. In general, in the forest it is much harder to keep the herd together and keep an eye on all the animals. Moreover, there are a couple of active leopards in the area which according to the local graziers and herders already have taken some 30 goats from all the herds grazing in the area (together totalling 500 goats). About half a year ago, also in Sunil's herd two goats were attacked and killed by a leopard in the CFM area. Ever since he does not go there anymore on his own.

Because his two brothers are both too young to do the work, he and his ageing parents are the only three people in his family who can take the goats for grazing. Therefore, they are not able to make optimal use of their community forest (which has the highest density of edible plants for the goats). At the same time, as Sunil remarks regretfully, Ajay Das, an 'urban grazier' from the nearby town is permanently employing two specialized herders and therefore is not being constrained in using their forest for the grazing of his large herd.

Ajay Das has enough financial means to permanently hire specialized goat herders. Therefore, labour does not form a significant access barrier for him, while it does for many other grazing families (see box 4.4.1). At the same time, Ajay is also embedded in a wider political economy of labour in the area. At the moment, he is experiencing a lot of competition from the booming construction sector, which has driven up the labour prices and has reduced his access to labour, as the labour force prefers the better wages in this sector. In other words, the construction sector is controlling the 'labour opportunities' (Ribot and Peluso (2003)). He even stated that he has to be very careful with allowing people on his property, as at times in his absence property developers have come to try to convince his labour force to come work for them instead, for higher wages.

#### **Power relations**

In general, Teen Mauza, as a small community having extensive grazing areas, both on forest and village land, is being surrounded by larger communities such as Basudia, Dasa Mauza, Haripur and Shankhamula. If they would consider to ban grazing activities by outsiders in their area, they would run against a lot of resistance of much more powerful surrounding communities. Thus, what appears to be a simple numerical imbalance, is also embedded in regional power dynamics in which Teen Mauza certainly does not have the upper hand.

Also, in today's age of modernity, 'absentee herd owners' such as Ajay Das are able to make use of the traditional flexibility and non-excludability of community grazing systems: as there are no rules that prohibit grazing by anyone in the community forests, people who have nothing to do with the area can come and appropriate grazing lands and resources, without giving anything in return. Ajay currently uses around 57 per cent of the fodder provision ecosystem

service of the Teen Mauza CFM area, without taking any heed of the local communal grazing system. In fact, Ajay's paid herders told me that they consider all the forests to be government land and therefore they see them as open access areas. They see the Forest Department as the only official 'owner' of the forests that could legitimately ban their grazing activities, but this governing body has very much abstained itself from any active management activities in the Ranpur range. As they are not aware of Community Forest Management, let alone of community forest boundaries, the herders think that any complaints from the surrounding communities would not be legitimate. Since Ajay is not solely dependent on grazing, he is not so much invested in it as the grazing-dependent families in the area. Therefore, it might well be that he is not grazing his animals in a sustainable way, and cannot ensure future availability of the fodder provision service of the forest ecosystem for himself or other graziers (Little 1985).

Little (1985: 132) found that absentee cattle owners in northern Kenya take advantage of communal grazing systems, thereby aggravating grazing conditions, and "in some cases, force the indigenous herders to adjust husbandry strategies". In the case of Teen Mauza, there is some evidence that Ajay Das's grazing activities, involving 235 goats, are already having an effect on the grazing activities of other graziers in the area. According to some community members the population of leopards has been increasing over the last years, because of the increased presence of goats in the area. Although it is impossible to assess to what extent this can actually be attributed to Ajay Das's herd (the increased ecological status of the forest also plays a significant role in this), it is true that the increased activity of leopards in the area has made grazing in the Teen Mauza CFM forest less accessible to alone-operating graziers like Sunil and Renu.

The arrival of Ajay Das to the area, six years ago and the start of his goat grazing activities 2.5 years ago have significantly altered the power dimensions in the area. Although the community members do not agree with some of the grazing practices of Ajay Das's herders (especially the cutting of branches for the young goats) they feel they cannot really forbid him to enter their forest, as they are afraid that he will use his power against them, being an influential businessman in the nearby town. Some prominent community members said that they would feel unsafe while shopping at the market in the nearby town, if they would be in open conflict with Ajay Das.

Due to power imbalance, Ajay's access to the forest has from the start off been larger than that of most of the local community's graziers, as labour availability, knowledge, cultural identity, leopard attacks etc. have not formed any access barriers for him. Meanwhile, the practice of his graziers of cutting off branches and small trees, and the possible effect of the presence of his many goats on the population of active leopards in the region has negatively impacted the local communities. While Ajay has been able to make a good living of his goat grazing and high-input farming, it might well be that due to his activities, grazing has become more difficult for the other graziers in the area.

### *Synopsis*

In this thesis I have operationalized grazing in the following two research questions: 1) how is the grazing/fodder provision ecosystem service distributed among different user groups in Teen Mauza, and 2) what access mechanisms are used to gain access to grazing/fodder provision and how are these embedded in existing social and power relations between different user groups.

In this section I elucidated how the fodder provision ecosystem of Teen Mauza forest is being distributed among the three user groups of community graziers: graziers from neighbouring

communities and absentee herd-owner Ajay Das. When it comes to the grazing done on the Teen Mauza village lands, 49% of the fodder provision service of this area is being used by the community graziers, while the graziers of neighbouring communities and the absentee herd-owner are using 17% and 34% of this service respectively. The fodder provision ecosystem service of Teen Mauza community forest is distributed quite differently: the community graziers are only using some 15% of this service, while the other two user groups are using 28% and 57% of it respectively.

When approaching the differences in the use level of the Teen Mauza fodder provision ecosystem service between the different user groups in terms of access and power relations, a general pattern emerges: most of the differences in use levels can be explained in differences in the access to labour of the different groups of graziers. Grazing goats in the leopard-invested, steep and thorny wilderness of Teen Mauza forest requires at least two full-time graziers, but the grazing households of Teen Mauza community cannot afford to spare so much labour. They mostly graze on the more easily accessible, but relatively poor grazing areas on the Teen Mauza village land. Ajay Das, however, does have access to labour, as he can afford to hire three full-time graziers to look after his goats. Also, these specialized herder-caste graziers are more well-endowed to deal with the dangers and hardships of forest-grazing.

The larger use of the graziers of neighbouring communities of the Teen Mauza fodder provision can partially be explained by the practice of labour-pooling of two graziers from the neighbouring community of Dasa Mauza: these two graziers graze their goats together, dividing the labour investment between two families. However, part of the differences in use levels between Teen Mauza community graziers and graziers of neighbouring communities can also be explained by the area's demographics. Teen Mauza is a small community surrounded by much larger forest-protecting communities, which have a higher ratio of goats to forest area. Thus, while the grazing areas of Teen Mauza are generally large enough to harbour the grazing activities of the community graziers, who have little need to move beyond the boundaries, the higher density of graziers in Dasa Mauza and other surrounding communities pushes them over their own CFM boundaries.

Access mechanisms can also shed a light on the question why only a few households of Teen Mauza are involved in goat grazing at the moment, although more people could choose to get involved in this livelihood activity. Also, in this case labour availability plays an important role: many people reported that grazing, although lucrative, is a very demanding livelihood strategy, which requires year-round daily labour. Not many households in Teen Mauza can physically afford spending this much extra labour. Even those who in principle could afford it, might not want to commit themselves to such a strenuous livelihood activity. Also, agriculture, the dominant livelihood strategy in Teen Mauza, is seen as a little less demanding, compared to grazing, as it allows people to take a period of rest in the lean season.

As the ownership of land is one of the most important pillars of social status, those who have land, cannot just sell it off and start grazing. Hence, most grazing households do some farming besides their grazing activities. Also, as the traditional occupation linked to the Khandayat caste (all of Basantpur's and a small majority of Lakhapada's households are off this caste) is cultivation, it is not appropriate for these families to switch to grazing as a primary livelihood strategy, especially in the homogenous village of Basantpur. Thus, besides labour unavailability, cultural identity also forms an important access barrier for many households, shaping the use of the fodder provisioning service of Teen Mauza forest.

The existing inequities between agricultural entrepreneur and absentee herd-owner Ajay Das, and the community graziers, has enabled the former to make more use of the fodder provision ecosystem service of Teen Mauza forest, while at the same time he has been able to protect himself better from the dis-service of leopard attacks.

#### 4.5 Distribution of and access to cultural ecosystem services in Teen Mauza

In this research, I have operationalized cultural ecosystem services by using the proxies of religious ceremonies (spiritual enrichment) and picnics (recreation) organized in, and individual non-use visits<sup>20</sup> (reflection and aesthetic experience) paid to the Teen Mauza community forest and village land in the household survey (see introduction of this thesis and MA 2005). One could argue that this operationalization is rather limited. However, it is not the purpose of this study to comprehensively assess the use of cultural ecosystem services in Teen Mauza community, but rather how cultural services are distributed in the community and how the notions of access mechanisms and power relations can contribute to shedding a light on why this distribution is as it is. For this reason I chose to limit myself to the most relevant and most easily researchable aspects of cultural services in Teen Mauza (besides the activities researched no other local recreational, religious, or aesthetic activities in Teen Mauza forest are known, and it was outside the scope of this study to comprehensively document how local knowledge systems (i.e. cognitive development) are being based on local people's relationship with the forest).

The most important religious ceremony and the only one conducted in Teen Mauza community forest, is a ceremony known as Giri Puja, which is attended by representatives of all the households of Teen Mauza but also of the surrounding communities. It is conducted every year at the start of the rainy season if the long-expected rains turn out to be late. The general consensus in the area is that the forest provides the people with the rains that are necessary for agriculture and thus that protecting the forests is not only essential to safeguard provisioning services, but is paramount in enabling agriculture as well. Most of the people believe that without the forests there would not be enough rain for agriculture (100% of the respondents questioned for the household survey agreed with the statement “ever since the forest has grown more healthy through our protection, I have observed that the rains have become more regular and frequent”, while 70% of the respondents came up with rain provision as an important local ecosystem service, while answering the open question of “what are the most important ecosystem services of Teen Mauza community forest for you?”). It is to the forests that they return if the monsoon is not behaving as anticipated, asking the gods to release the rains. This ceremony thus can be seen as the very embodiment of the people's intimate relation with the forest.

People from all the communities connected to the forests of the south side of the Ranpur Range, including Teen Mauza, Basudia, Areda, Dasa Mauza, and the farther-off villages of Kalamatia and Dhamara, gather on a rocky outcrop high up the forested hills near Akhupadar village. In practice, the group assembling on this ritualistic site consists mostly of men, youngsters and (some) children, while only very few women attend the ceremony. The general consensus among the Teen Mauza inhabitants is that women are not disallowed to join the ceremony, but that the general situation of gender division in the area does not allow them to move too far from the domestic sphere. In practice this means that only a few women attend the

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<sup>20</sup> Non-use indicates that the person is visiting the forest purely to enjoy the benefits of just being there, without taking anything from there, and without having any other purpose for his/her visit than reflection and aesthetic experience.

Giri Puja, usually those from larger villages, where overall there are more women and thus the chance that any of those women will find an opportunity to come is larger. Apparently, the practices of the caste-Hindu inhabitants of the area are dominant in the conduction of the Giri Puja ceremony, because even the women of the traditionally non-Hindu tribal people from Akhupadar are reported not to participate in the ceremony.

Table 4.5.1 shows the percentage of households who go for picnics and individual visits in the Teen Mauza area, and the percentage of these in which women participate (for instance, of the households which hold picnics in the forest, only 27% involves any women). With individual visits are meant, visits to the forest which are not undertaken for any use-purpose, but with the sole non-use aim of enjoying some time alone in the forest.

Table 4.5.1: The distribution of cultural ecosystem services in Teen Mauza

	Percentage of households in Teen Mauza making use of cultural services through listed activities	Percentage of households making use of cultural services in Teen Mauza in which women participate in these activities
Giri Puja ceremony	100%	0%
Picnics on Teen Mauza land	34%	18%
Individual visits to the Teen Mauza forest (non-use)	22%	0%

Table 4.5.1 shows that in Teen Mauza 34% of the households go for picnics in the forest or on the village land (the reported frequencies of these picnics were between 1 and 10 times per year), while a total of 22% of the households have members who visit the forests on their own with no other purpose than spending some time alone over there (the reported frequencies of these visits had a wide variance, ranging between several times per year and several times per week). In the case of picnics, 18% of the picnicking households included women, while individual visits to the forest turned out to be exclusively undertaken by men.

When looking at the data of the household survey, no significant differences were found between the propensity of tribal and non-tribal households to go out on picnics (within both groups about 34% reported to organize picnics in Teen Mauza). Ethnicity therefore did not prove to play a significant role as a distributional factor of the ‘picnic proxy’ of cultural services in Teen Mauza. There is no evidence that ethnicity does play a role in the other two proxies for the cultural services of Teen Mauza: Giri Puja and individual visits

The table thus shows that the use of cultural services in Teen Mauza is highly gendered, with women hardly being able to access any of these services. As mentioned before, this gendered distribution of cultural services is embedded in the wider traditions surrounding Hindu gender roles in rural India. It is thus unsurprising that the 18% reported to include women in their picnics are for a large part tribal households in which these conservative Hindu gender roles in general are not being practiced and most women are a lot more empowered (see chapter on NTFPs). In the case of cultural ecosystem services in Teen Mauza, because of the existing inequities between man and women, these services do thus not benefit men and women equally.

#### 4.6 Distribution of the ecosystem dis-service of crop damage in Teen Mauza

The most prominent and impactful dis-service in the Teen Mauza (and surrounding) area is crop damage. Since rice and different kinds of pulses (mostly black gram and mung beans) are the most widely cultivated species, most of the crop damage in the region is occurring in these crop types. There are several wild animals native to the forests of the Ranpur range that are known to be regular foragers on the surrounding villages' fields. The most prominent among these are wild boar, Hanuman langur monkey, peacock, wild buffalo and elephant. In addition to this some people reported crop damage to the rice crop by parrots and other bird species. In this chapter I will focus on the two species of animals from the forest known to inflict most of the damage to crops: wild boar and Hanuman langur monkey. Before elaborating more on this, it is important to point out the critical differences between these two species in order to get an understanding of the impact of crop damage in the region.

First of all, wild boar and monkeys impact different crops. The wild boar mostly forage on rice, while the monkeys prefer pulses. Secondly, wild boar only come to the fields at night, while the monkeys' foraging is diurnal. This means that in order to protect the crops against crop damage by these two animal species a 24-hour vigilance by the villagers is required.

Most of the farmers can clearly not afford the level of crop protection necessary to completely prevent crop damage on their fields, also because fencing is not an option that lies within their financial means. Interestingly, given that Ajay Das, the urban-based agricultural entrepreneur, firstly is the only local crop grower who has completely fenced off his fields, secondly is using watch dogs, thirdly at all times has people on his farm (the permanent staff is living on-site), and fourthly is using air guns to scare of wild animals, he still is losing about 10% of his annual yield to monkeys (wild boar *are* effectively being closed out). Crop damage hence seems to form an unavoidable part of the Teen Mauza farming system.

In Teen Mauza, crop damage by monkeys is less wide-spread than crop damage by wild boar, because not everyone is able to grow a second crop of beans (this winter season 63% of the households had beans on their fields), while rice is being grown by 94% of the households of Teen Mauza. However, the average reported per-household impact of crop damage by monkeys to the pulse crop is a lot higher than the rice crop damage by wild boar (55% harvest loss for pulses compared to 19% for rice<sup>21</sup>). I have observed that during the day monkeys tend to be located close to, or in the villages (especially Basantpur was frequently visited), while at night they return to the forest to sleep. In the villages they mostly hang out in the larger fruit trees of mango and tamarind, while occasionally venturing out to the fields to eat some pulses. Because of their general presence in the villages, and their acrobatic mobility it is impossible to totally prevent them from damaging the fields, even though dogs are being used to scare of the monkeys and these dogs are freely roaming around the villages. This explains why crop damage by monkeys is such a serious issue, and why as mentioned before, the absolute bottom line of crop damage in the area is the 10% that Ajay Das is facing on his heavily protected fields.

From monkeys no fields are safe, but it is especially those fields close to the villages where they tend to hang out during the day that are impacted most. While, as I will elaborate in the remaining part of this chapter, crop damage by wild boar is determined by proximity of the fields to the forest fringe, this does not hold for crop damage by monkeys. The latter is a lot more evenly (low variance of responses) and more randomly distributed in Teen Mauza area.

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<sup>21</sup> All these percentage are based on a two-year average of harvest losses due to crop damage by animals over 2010 and 2011 as reported by the Teen Mauza inhabitants in the household survey

I mostly focused this study on dis-services on the impact of rice crop damage by wild boar, which was reported by 67% of all farming households. To guide the answering of the question why some rice fields are much more impacted by crop damage than others, I formulated three hypotheses:

1. The level of crop damage is mostly determined by the field's proximity to the forest;
2. The level of crop damage is mostly determined by the families' ability to fence off fields;
3. The level of crop damage is mostly determined by the families' capacity to actively protect their fields.

While gathering evidence as proof or disproof for these hypotheses, I found that most of the evidence pointed towards the first hypothesis (see Figure 4.6.1). I also found that the reverse was true: there is one farmer in Akhupadar who reported to have no crop damage at all, and his fields turned out to be located in the middle of the Akhupadar valley at a maximum distance of all the surrounding forests. Also for the Basantpur and Lakhapada farmers this was generally true: those who did not report any damage, have fields that are farther away from the forest and outside the red zones depicted in Figure 4.6.1.

The darker red zone in the north part of Teen Mauza (split in two by the cursively marked grazing lands), close to the CFM forest was reported to be subject to 75% of all the crop damage on Akhupadar land. Crop damage by wild boar to rice in this area was reported to be very high: above 35% on average over the last two years. If taking together the damage inflicted by *all the animal species* to the rice fields of Akhupadar, the reported average damage was even above 50% (here much crop damage is also inflicted to by peafowl and wild buffalo). The reason why this area is reported to be impacted so much is that Akhupadar village is situated in a valley, surrounded by forest. Also, the forest north of Akhupadar is much more connected to the larger and more thickly forested areas of the Ranpur range.

Judging from these figures, the question why anyone would still continue farming in this area comes to mind. It is important to take into consideration, however, that since some of the farmers saw us as extension officers, there was an incentive for them to over-report the crop damage on their fields in the hope of getting compensation for it. In general, most of these outliers were responses by Akhupadar residents. On the other hand, not all the responses given in the household survey were biased in this way, as there were quite some household heads who stated that their fields had no damage at all. Thus whereas the figures in the household survey data probably are an overestimate of crop damage in Teen Mauza, they do point out the severity of the issue in the community. Also, the Akhupadar people will probably continue to farm these heavily impacted fields, because they are not completely dependent on farming and base a substantial part of their livelihood and sustenance on the consumption and sale of forest produce (see NTFP chapter).

When interpreting Figure 4.6.1, it appears that the main population of wild boar is keeping up in the large Reserve Forest of which the Teen Mauza CFM area forms a part, and that from there a part of the population at times crosses over the Akhupadar valley through the fields and plantations to the Basantpur and Lakhapada forest which also is a wild boar habitat or resting place (we found large quantities of scat in this forest). From this forest the wild boar seem to move southwards, foraging through the rice fields of Lakhapada.

Figure 4.6.1 shows that the majority of the Teen Mauza fields that are situated along the forest and plantation/agroforestry fringe are being impacted by crop damage and that there is a certain radius of action around the forest within which the wild boar are most actively foraging



(this is reported to be around five field-lengths in the case of Basantpur and Lakhapada, and a little more in the case of the larger wild boar population of Akhupadar forest)<sup>22</sup>. All the farmers who reported to have very little or no crop damage in the household survey own fields beyond this ‘crop damage border line’ (between the red and white area on the map). On the Akhupadar lands, the fields closer to the village are reported to be less impacted by crop damage; there is a no-damage radius around the residential area. However, this was not reported for the other villages. Another interesting finding is that according to the farmers of Lakhapada some fields that are farther away from the forest are being impacted, because the wild boar make use of the road going south from Lakhapada to the neighbouring village of Basudia (here the ‘crop damage border line’ bulges out in southern direction). For some reason, this ‘road effect’ cannot be observed in Akhupadar, where the fields at the road side are reported to be impacted less than the fields farther away from the road. Apparently here the foraging route of the wild boar does not follow the road, since the road lies outside the main foraging areas.

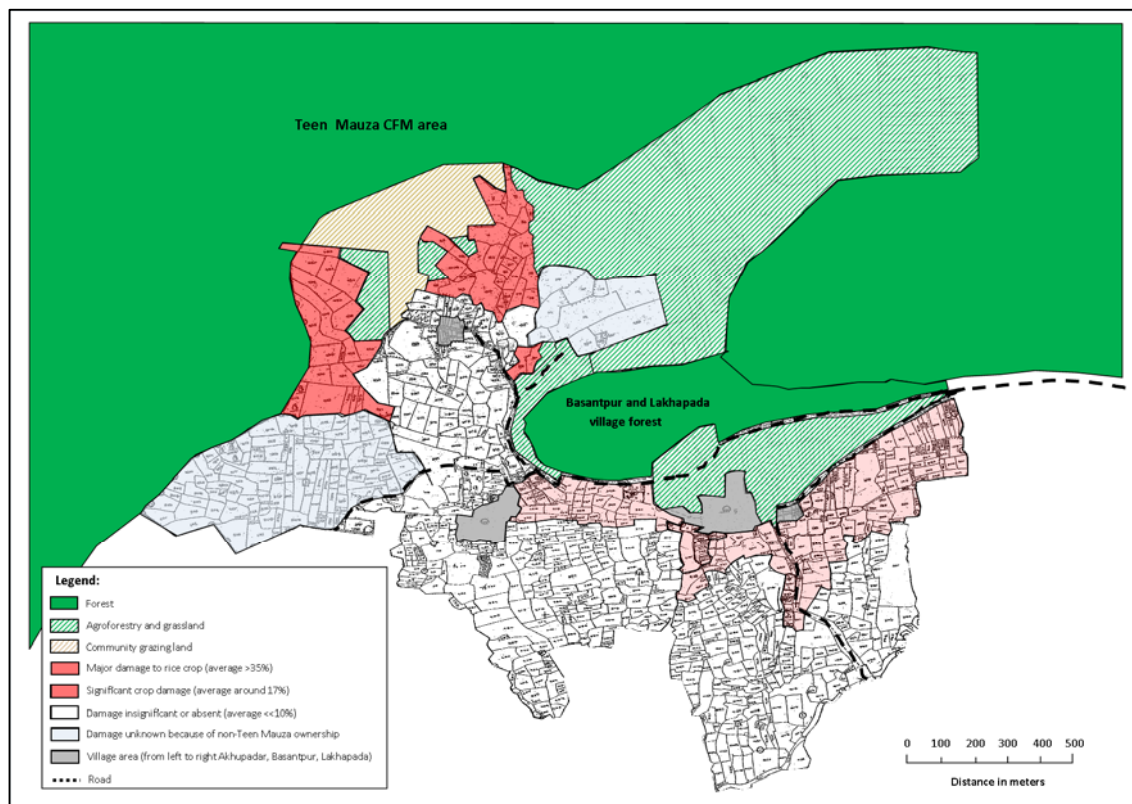


Figure 4.6.1: The distribution of reported crop damage (based on the household survey data) by wild boar to rice fields in Teen Mauza (image based on the 1995-1996 version of the cadastral maps of the Teen Mauza villages issued by the Ranpur branch of the Revenue Department)

Coming back to the second hypothesis, in Teen Mauza fencing is not a feasible protection method for the small scale farmers. At the same time, Ajay Das’s fencing shows that it can effectively prevent damage by wild boar (although monkeys have no problem jumping the fence). Lack of adequate financial capital in this case forms an ‘access barrier’ for the farmers to make use of fencing.

<sup>22</sup> The crop damage maps of the three villages were drawn together with and verified by key informants of the respective villages.

As to hypothesis three, active rice crop protection by the small-scale farmers is widely being practiced in Teen Mauza. The most common methods of crop protection are sleeping out in the field and the use of lanterns and scarecrows (while dogs are being used in the case of crop damage by monkeys). The first of these implies the sleeping of one of the male household members in a little shelter on the border of the field, some weeks before and during the harvesting season for a maximum reported period of two months (estimates vary between occasional sleeping out and sleeping in the fields for two months in a row). Some people also reported to sleep in the common room and get up every two hours at night to see whether any wild boar have come to their field. Generally, the households whose rice fields are impacted most by wild boar have someone sleep out in the field most frequently. 40% of the households impacted by crop damage of wild boar reported to have someone sleeping in the field while 35% of them uses either lanterns or scarecrows. These activities, in general, are organized on a per household basis: no pooling of vigilance activities among households was reported. Overall, there is no evidence that supports the hypothesis that those houses who have someone sleep out in the field are having significantly less damage than those who have not. In general only the households which are suffering most of the crop damage are protecting their fields through sleeping out, and there is no evidence that there are households that cannot afford to have someone guard the fields at night. This means that sleeping out in the field is not a very important determining factor for the distribution of the ecosystem dis-service of crop damage among the households in Teen Mauza. The reason why some households have less crop damage is not because they are protecting their fields, since these households do not protect their fields at all. In the end, while sleeping in the field might reduce crop damage a little, it cannot altogether prevent it, while proximity to the forest is much stronger determinant of crop damage.

#### *Increasing crop damage: conflict, power relations and the distribution of 'good land'*

When looking at the issue of how the fields that are impacted most by crop damage are divided among the villagers of Teen Mauza, the village of Akhupadar forms an illustrative case. Residents of Akhupadar reported that since the land settlement that took place in the eighteenth and nineteenth century they have had a lot of agricultural land at their disposal, while there have not been enough people to farm it all. For this reason, they have sold off about half of the total area of their arable land over the last decades. These people also made clear that at the time of selling there was no issue with crop damage, as the forest was in a very degenerated state. Crop damage is a much more recent phenomenon of the last five years or so, when the effects of the community's protection system really started to be seen in the regeneration state of the forest. In hindsight though, it has turned out that the 'good lands' the Akhupadar people have kept for themselves have increasingly become less favourable, because it is exactly these lands that are currently mostly targeted by the foraging of wild animals. What once were the best fields - in general the fields closest to the forest are seen as the most fertile in Akhupadar because of the sedimentation of nutrients from the hilly forests - have now turned out to be among the worst when it comes to crop production.

One of the villagers pointed out that it is through sheer 'luck' that some of them have always had their field in the (perhaps less fertile) middle of the valley which is hence currently not being impacted by crop damage at all: "It is not because of wit that this man has got the best area of land at the moment". No one had expected that crop damage would turn out to be such an impeding factor for agriculture, and hence its effects were not anticipated in the land selling

process. As the land ownership pattern cannot be turned back anymore, agriculture, because of the increase of crop damage over the last years has become a very much problem-ridden livelihood activity for the tribal people of Akhupadar.

Also in the rest of the community, crop damage is a heated issue and has led to conflict in the community and to a deterioration of its relation with the Forest Department. The general consensus in Teen Mauza is that crop damage has been on the increase over the last decade. Especially, they mention that the population of wild boar seems to have increased exponentially. While most of the villagers do not directly attribute this to the improvement of the forest's condition (and with this the increased habitat size of wild animals) because of their protection efforts, they think it is only fair that they should get financial compensation from the Forest Department for the damage inflicted on their fields. The Forest Department, however, does not compensate villagers for crop damage done by animals other than elephants (which hardly come to the village at all).

An important point of conflict in the community is the issue of protecting the fields through shooting wild boar. Despite that on paper the Forest Department does not allow the harming of any wild animals inside and outside of the forest, some men of Basantpur in the harvesting season frequently go out with a gun at night to 'scare off' wild boar. These 'hunters' are very unpopular in the Teen Mauza community, and many people reported that they cannot allow it and will take steps to cease their activities, because it is in conflict with the rules of the community forest protection system (see box 4.6.1). However, the 'illegal hunters' themselves say that they have no choice but to do something about the wild boar situation.

Overall, crop damage in Teen Mauza has become unavoidable for most of the farming households, and there are very few effective coping strategies that can really mitigate its effects. The only strategy that really would work, assuming that households would make individual rational choices, is the selling off of heavily impacted lands to substitute them with better lands. However, the ownership structure of all the arable land in the villages of Ranpur has already been settled, and purchasing land, in general, is not easy. One of the more well-off household heads of Lakhapada told me that they have considered selling some of their heavily impacted land, but in their village the lands which are less impacted are more fertile, which means that he would have to sell three acres of his current land to be able to buy 1 acre of land that is crop damage-free. This, he says, he cannot afford. This example illustrates that even for the relatively more affluent households in Teen Mauza it is not possible to effectively cope with crop damage through mechanisms such as 'buying themselves out'.

In Teen Mauza, the distribution of ecosystem dis-services, just as that of ecosystem services is embedded in power relations. However, as argued in this chapter, exposure to crop damage is comparatively less influenced by power and more by the geography and ecology of the region, than the distribution of ecosystem services. One exception to this general situation is Ajay Das who, because of his access to financial capital, through fencing, is able to effectively protect his land against crop damage by wild boar. At the same time, even he cannot completely prevent crop damage, as monkeys are still responsible for a loss of 10% of his harvest.

*Box 4.6.1: The Basantpur men and their “loose firings”*

One evening around dusk, while taking a short-cut across the now mostly harvested rice fields on the way back to our host family in Basantpur village, me and my colleague see three men approaching, one of them carrying what seems to be a large stick across his shoulders. When they come closer we are a little shocked to see that what we just saw was not a stick, but a hunting rifle. The man carrying the gun is wearing a dark red balaclava, the other two are also dressed for the cold weather (it is winter and the nights do get quite cool with temperatures around ten degrees and high humidity). Also the men are carrying large flashlights. Me and my colleague are still a little perplexed and I feel the urge to avoid getting too close to them, judging by their appearance that they would rather avoid us as well, but at the same time I feel that the curious anthropologist in me is struggling hard to get the upper hand. To my surprise the men do not turn away from us and actually approach us, apparently to share a few words. Then we recognize the men as village members of the village we are staying at. The man with the balaclava smiles back at us and tells us they are going off to the Basantpur and Lakhapada village forest to “scare off” the wild boar. We kind of light-heartedly answer that we are interested to come along to see how they do this (knowing we are not dressed, or otherwise prepared for such an adventure in the dark). We are again surprised by the man’s answer that perhaps next time we could come along, if we are better prepared. Leaving us in a state of confusion the three men continue on their way to the forest and we make our way back to the village. ‘Are they taking the back road and have they covered up their faces in order not to be seen by too many people?’ Upon our return to the house of our host family we relate the story to our host, whom, we know, is well-aware of the fact that many people in Teen Mauza and especially those from Akhupadar and Lakhapada are very much opposed to what they call these “hunting activities” of his fellow villagers. His answer does not lift the remaining shrouds of confusion in our minds as he laconically defends “the hunters” by saying: “There is no problem, they are just doing some loose firing”.

**Synopsis**

In this research, crop damage, and especially that by wild boar, was operationalized as the most prominent ecosystem dis-service in Teen Mauza. The research questions on this topic that I posed are: 1) how is the dis-service of crop damage distributed in Teen Mauza, and 2) what are the main determinants in the distribution of this dis-service and how are these embedded in existing social and power relations?

In this chapter, I argued that crop damage forms an inescapable part of agriculture in Teen Mauza: 67% of the farming household reported damage by wild boar. The fact that crop damage by monkeys is even significantly affecting the very well organized commercial agriculturalist Ajay Das further illustrates this point. The most important factor in the distribution of crop damage in the community is the proximity of the agricultural fields to the forests, which are an important habitat for an increasing population of wild boar. Fencing did not prove to be a feasible method for the Teen Mauza inhabitants; the only farmer who has made use of this method is the well-endowed absentee agricultural entrepreneur Ajay Das.

Also, other crop protection mechanisms such as sleeping out in the fields and the deployment of lanterns at night, are not of determining influence on the distribution of crop damage by wild boar. While these methods are helping some farmers to limit the crop damage on their heavily impacted fields, there are quite some farmers who have no need to actively protect

their fields at all, because of the absence of any crop damage. These methods are thus not really affecting the distribution of crop damage as such, which is determined by the geographical location of the fields, and should be seen as a mere curative measure to diminish the impact on those fields which are already being targeted most.

As the general consensus is that crop damage, and especially that by wild boar, has been on the increase in the community over the last decade, it has become a very much debated issue in Teen Mauza. In Akhupadar, where the most affected fields are situated, farmers in the last decade have sold off most of the fields which now have turned out to be in the low-impact zone. Because crop damage did not occur at all at the time of sale, it was not anticipated to be of importance in the near future. The fields they chose to keep, perceived to be the best fields at the time of sale, have turned out to be the worst in terms of crop damage impact. However, the current distribution of land cannot be turned back.

Some residents of Basantpur have taken to 'hunting' wild boar as a method to reduce crop damage. While it is not clear whether they are actually killing any animals, or if they as they themselves and most of the Basantpur villagers claim are only 'scaring them off', this issue has become heated and often-debated. Some opposing community members expressed that they find the behaviour of these 'hunters' unacceptable and that steps should be taken to stop them.

The case of some wealthier farmers in Lakhapada who are not able to sell off their much-affected land in order to buy less impacted fields, is illustrative of the fact that for the average Teen Mauza resident it is not feasible to "buy out" of crop damage or deploy any other strategy to completely prevent it. It is through sheer 'luck' that some farmers own fields that are devoid of any damage. The evidence shows that geography and ecology are acting as more dominant determinants in the case of the distribution of this dis-service than in the case of the distribution of the benefits of ecosystems in Teen Mauza.



## 5. Discussion

This section discusses the findings of the case study conducted in Teen Mauza community, in light of the three objectives of this study. The wider implications of my findings will also be discussed pertaining to: 1) applying the *Theory of Access* to intra-community research, 2) how my research can be followed up and extrapolated to elucidate the role of trade-offs between ecosystems in Teen Mauza and in ecosystem services research in general, 3) how my findings inform the important notions of ecosystem management and participation, and 4) what the implications of my findings are for the relationship between ecosystem services and the development of the poor, pointing out how further research is needed to bring to light how ecosystem services in some cases may reinforce existing inequities. The last part argues that in order to address these issues, more open-ended empirical analysis is required in ecosystem services research.

### The distribution of ecosystem services in Teen Mauza

The case study results point out that ecosystem services are not equally benefitting all the community members of Teen Mauza. When drawing comparisons between the distribution of these different services from the Teen Mauza community forest, one observation that stands out is that for all of these services some community members are *not at all able to benefit*. This holds for non-tribal households with regard to NTFPs (especially Siali which is exclusively collected and sold by tribal households), Scheduled Caste migrants with regard to bamboo, households with labour shortages regarding fodder provision, and Hindu-caste women regarding most of the cultural services.

Apart from the proportion of users and non-users (or those who are not able to make use of a particular ecosystem service), the distribution between the different *user groups* (or those who are, at least to some extent, able to make use of a particular ecosystem) also differs per ecosystem service. A common denominator of these distributions is that all ecosystem services show large disparities in use level between user groups, the maximum average difference being around a factor of 38 for tubers in the case of NTFP provision (a tribal household collecting 38 times more tubers on average than a non-tribal household). When looking at the total flow of NTFPs, represented by tuber and mushroom collection, 90% of the tubers and 68% of the mushrooms collected by Teen Mauza residents is collected by the tribal people of Akhupadar (who only make up 20% of the population). In the case of bamboo provision, on average per household the tribal people of Akhupadar use more bamboo than the people of Basantpur and Lakhapada (2.3 bundles versus 1.3 bundles), but the total flow of this service to the non-tribal community members is over 2.5 times as large. For bamboo the hypothetical user group of Scheduled Caste basket makers was included in the distributional analysis: *if* they would be getting all the bamboo they are using for basketry from Teen Mauza it *would amount* to a use level that is 4.5 times larger than that of the all Teen Mauza residents taken together. For grazing, Teen Mauza goat herd-owners are using 15% of the fodder provision service of the community forest, while non-Teen Mauza herds are using 85% of the total fodder provision. Women are not able to make use of any of the cultural services besides picnics, in which 18% of the households that make use of this service involve women. As to the dis-service of crop damage by wild boar, reported damage to the rice fields ranged between 0% and over 80%, with an average of around 12%.



Looking at the totality of the ecosystem services researched in Teen Mauza, there are large differences in the use level of these services within the community: some households are part of a user group for all four of the ecosystem services of which the distribution was analysed, while there are also some households who hardly use any of the services under study. Some of the more well-off farming households of the Khandayat caste in Basantpur are falling into this latter group: they do not have much cultural affiliation with grazing and use very little NTFPs, or bamboo. Also some more wage labour-based families in Lakhapada are falling within this category. These two categories of households stand in stark contrast with some of the tribal households who derive a significant part of their subsistence and income from the use of ecosystem services from the community forest. Given the significant disparities between different user groups in the community, the Teen Mauza case study illustrates that this 'local community' does not function as a homogeneous entity.

### **Access mechanisms, social relations and power in Teen Mauza**

Answering the question of why are ecosystem services in Teen Mauza distributed as observed, required an empirical analysis of the social and power relations in which ecosystem service use is embedded. Synthesizing the findings on the four ecosystem services, it becomes clear that there are specific access mechanisms that play a very important role in the distribution of the ability to benefit from the Teen Mauza forest ecosystem. Most important among these is cultural identity, which governs access to grazing (for members of the Khandayat caste it is not culturally appropriate to become pastoralists), NTFPs (sale of NTFPs is not culturally appropriate for non-tribal people) and bamboo provision (from which the low-ranking Scheduled Caste community is being excluded). Teen Mauza is a diverse conglomeration of Scheduled Tribe, Scheduled Caste and General Caste people and also is the place of the farm of an affluent absentee entrepreneur. This cultural diversity also means a diversity of identity-tied livelihood specializations. A person's ability to benefit from one of the ecosystems under study has shown to significantly depend on his or her ethnic background: social control in the community makes sure that for instance non-tribal people will not start earning money from the sale of NTFPs.

Other access mechanisms that play a significant role in the distribution of ecosystem services in Teen Mauza are gender (an aspect of cultural identity) labour availability, knowledge, and geography (in the case of the dis-service of crop damage). Just as in most rural societies, gender is an important determinant of labour division in rural Hindi culture. Since this labour division very much binds women to the domestic sphere, it influences their ability to benefit from ecosystem services. A person's gender, just as his or her ethnic background, dictates what livelihood strategy is culturally appropriate and therefore plays an important role in negotiating access to resources. This is the reason why for instance the vast majority of the women do not have access to cultural services such as recreation and religious ceremonies in the community forest. The absence of strong gender divisions in the tribal village of Akhupadar ensures that tribal women do have access to NTFPs, which enables them to generate some income for themselves.

Labour availability has shown to form an important access mechanism pertaining to grazing. It is because grazing families in Teen Mauza cannot afford to allocate two people to goat grazing, which is a prerequisite for grazing in the dense forest, that they have less access to fodder provision of the community forest than those who have no shortage of labour. The most prominent among the latter groups is the absentee herd-owner Ajay Das who can afford to permanently employ specialized herders for his goats. Some graziers from neighbouring



communities have increased their access to the forest by pulling their labour through grazing their herds jointly. The high labour requirements of grazing goats in the community forest, also play an important factor for households not to switch to grazing as a livelihood strategy in the first place. Knowledge, stating the general consensus, also plays a role in the choice to switch one's livelihood to grazing, as grazing requires specialized knowledge on goat rearing.

Geography only played a decisive role in the distribution of crop damage in the community, while it did not prove to be of much importance in the distribution of the services. The fields closest to the forest fringe were uniformly reported to suffer more damage than the fields that are located farther away on the plane. Crop damage in Teen Mauza is a recent phenomenon: the protection efforts of the community have allowed the community forest to regenerate from shrubland to a more dense forest type, which probably also led to an increase in the habitat area of wild boar. The consensus in the community is that over the last years, crop damage has significantly increased and that especially wild boar populations have increased dramatically.

My empirical analysis of ecosystem services highlights that in the distribution of ecosystem services in the Teen Mauza community, cultural, social and economic access mechanisms were most influential, whereas in the distribution of dis-services the biophysical factor of proximity to the forest was most important: ecosystem services are thus more embedded in social processes in Teen Mauza than ecosystem dis-services. This introduces an element of randomness, or 'luck' in the ability of people to derive a large net benefit from the community forest, with those people who happen to be 'unlucky', having most crop damage on their fields. Ajay Das is able to escape the effect of forest proximity for a large extent, as he is the only farm-owner who can afford fencing (in the case of dis-services not an access but a defence mechanism), which effectively keeps the wild boar from foraging on his farm. As for all the other farm owners, crop damage is inescapable, this shows that Ajay stands out as a much more powerful player in the political ecology of resource use in Teen Mauza. This links up with the third and last step in Ribot and Peluso's (2003) empirical analysis: situating these access mechanisms in the power relations that underlie them.

### **Power relations in Teen Mauza: implications for the Theory of Access**

Taking the last step in my analysis of linking access mechanisms to underlying power relations, confronted me with some important differences between my largely intra-community research and Ribot and Peluso's envisioned scale of analysis. This also is the reason why I could not show much evidence on power relations in the results chapter. The *Theory of Access* was conceptualized for conducting power analyses in the wider political ecology of resource use from powerful state-backed agents and influential industries to local user communities. Implementing the last part of the framework of situating access mechanisms in the power relations in which they are embedded, would thus largely proceed along the divide between the powerful outsiders and local communities. In my case study there is only one 'powerful outsider', the entrepreneur Ajay Das, while the majority of the power relations that play a role in the distribution of ecosystem services in the community are a lot more subtle and implicit. In fact it would be more accurate to describe these with the broader term of social relations, rather than power relations.

Taking aside Ajay's clear role as a powerful outsider (at least in relative terms), power in Teen Mauza is a lot more elusive and case-dependent than is the case in access analyses performed in the wider political ecology. Within the community, those who are among the more 'powerful' regarding one ecosystem service, are among the powerless when it comes to another

service. For example, since labour availability influences grazing households' access to the fodder provision service of the community forest, families with more labour to spare have a more powerful position when it comes to benefitting from fodder provision. The same labour-rich households (provided they are not tribal) are not in a powerful position when it comes to generating income through the sale of NTFPs, since this is only appropriate for those with a tribal identity. This indicates that ecosystem services use in Teen Mauza is much more related to informal social control than to large power disparities.

Comparing the results of my fieldwork to the theoretical framework of Ribot and Peluso (2003) and the ideas presented in the papers of Ribot (1998), and Larson and Ribot (2007), it is important to point out the limitations of the *Theory of Access* when it comes to studying differentiation within communities. The authors themselves point out in a footnote to their paper that their study “does not discuss differentiation within communities—which raises an additional set of issues with regard to access—but rather highlights the differences between wealthier and more powerful outsiders, often logging companies, for example, and those who live in or near forests and have more limited livelihood resources” (Larson and Ribot 2007: 189).

Strictly following the framework of the *Theory of Access* would result in concluding that the only power struggle taking place in Teen Mauza is that between the community members and absentee entrepreneur Ajay Das as a ‘powerful outsider’. This would, however, mean a complete glossing over of the significant distributional issues between the community members. Also the fact that graziers from neighbouring communities (also ‘local people’) are using the Teen Mauza community forest more than the community graziers themselves would not be a topic for inquiry. Missing all these important distributional issues would lead to a necessary conclusion that resource use in the community is rather uniform and that the community could be seen as a homogeneous entity. In the following section I sum up some of the lessons that could be drawn from my research in Teen Mauza by means of which I attempted to contribute to addressing the “additional set of issues with regard to access” for research at the intra-community level (Larson and Ribot 2007: 189).

Within the community, cultural difference is the most important determinant of the distribution of ecosystem services. Especially in such a hierarchical social system as that of Teen Mauza, India, the different strata (castes) in society are linked to very distinct livelihood practices. In this case, access to for instance NTFPs is not physically barred, in a sense that in theory no one will stop anybody who is going to collect them. If one would, however, collect and sell NTFPs if not culturally appropriate, others would associate this person with the subculture of another, and in this case lower, caste. This in turn could lead to social exclusion and other serious relational problems.

A second aspect that came to the fore is the role that knowledge can play in intra-community access differentiation. The *Theory of Access* mostly conceptualizes knowledge as something which can be deployed to gain, maintain or control access (for instance by monopolizing knowledge essential for harvesting, processing, or through using scientific knowledge to get access to certain resources). However, knowledge also can be an access barrier on a personal level, simply because some people do not know how to harvest certain NTFPs, for instance. In this case personal lack of competence prevents one from being able to benefit from these NTFPs. These more subtle aspects of access come to the fore when researching the distribution of access within Teen Mauza community; the conceptual framework is simply not tailored for these kinds of assessments. Further intra-community research on resource rent distribution and how it connects to the *Theory of Access* is needed to extent the theory's applicability for the empirical analysis of ecosystem service distribution.

Overall, my study of the actuality of ecosystem use in Teen Mauza shows that it is a heterogeneous community: its ecosystem service use cannot be described by a singular indicator for human wellbeing. It is to be expected that Teen Mauza does not stand out as a unique case: it has long been acknowledged that the story of homogeneous communities is a myth (Agrawal and Gibson 1999). This challenges the conceptual model of ecosystem services research.

Another important finding of my field work in Odisha, is that the actuality of the forest management systems in Ranpur defies the idea used in ecosystem services research of forests as generating ecosystem services with most direct services being used by surrounding communities of beneficiaries. In the Ranpur area social relations and processes, such as the forest access and community management negotiations in the area, have resulted in the situation that forest patches are sometimes not accessible to surrounding communities, because they have been allotted to more distant communities. Hence, the flows of some provisioning ecosystem services (in this case of fuel wood and bamboo) seem to ‘jump over’ adjacent communities to reach communities of beneficiaries farther down in the valley. At the same time, some regulating services such as hydrological services, pest control, and pollination mostly benefit those who are living closest to the forest, while dis-services such as crop damage are also stronger pronounced in the proximity of the forest. The former again illustrates that through researching the social relations in which ecosystem services distribution is embedded in Ranpur, an extra element of complexity is added to the relation between the community and the forest that is normally overlooked in ecosystem services research.

### **Trade-offs between ecosystem services and ecosystem users**

As I pointed out in the theoretical framework of this thesis, studying ecological trade-offs between ecosystem services is an important aspect of ecosystem services research which has largely been omitted from the main body of ecosystem services literature (see Lélé *et al.* forthcoming). With this thesis, I have made a first attempt at showing that through empirical inquiry a political ecology approach can also be instrumental in enhancing our understanding of the biophysical context of ecosystem services provision and use.

In addressing the issue of trade-offs, I make use of the conceptualization of trade-offs of Swallow *et al.* (2009: 508) who state that “[t]radeoffs between ecosystem services arise from management choices made by humans, which can change the type, magnitude and relative mix of services provided by the ecosystem”. Adding to this, I argue that in fact these management choices should be seen as choices between alternative land-use types, each providing a different, specific bundle of ecosystems services (see Figure 2.1). My study differs from studies such as that of Van Beukering *et al.* (2003) in that it does not look at the effect of the *whole bundle of ecosystems* services of a certain land-use type on stakeholder groups from the very local (clubbing all local users in one group coined local community) to the global, but that it takes *individual ecosystem services and their concomitant user groups* as a basis of analysis (graziers, NTFP collectors, bamboo artisans). In fact I argue that, especially in forest-dependent societies, livelihoods are usually organized around individual ecosystem services and not around whole bundles of ecosystem services, which means that communities should be disaggregated into livelihood groups in order to understand the actual distribution of ecosystem services.

As the study in Teen Mauza shows, ‘management’ choices are not always made consciously (Swallow *et al.* 2009) and are embedded in the political ecology of resource use. The current land-use type and the bundle of ecosystem services it provides to the Teen Mauza community and beneficiaries on a variety of larger scales, was not consciously decided upon and

recorded in a management plan. I should instead be seen as the outcome of an on-going negotiation process embedded in a power struggle between different groups of resource users. Through using the *Theory of Access*, my study has been able to generate an understanding of the negotiation processes that have led to the current distribution of ecosystem services in Teen Mauza.

When looking at the Teen Mauza bundle of ecosystem services - the totality of ecosystem services provided by the Teen Mauza community forest - some important trade-offs between ecosystem services emerge. The most obvious trade-off among the services that I studied in detail is that between grazing and NTFP collection. However, as Raudsepp-Hearne *et al.* (2010) shows that the most important trade-offs between ecosystem services often are taking place between provisioning and regulating services (e.g. timber harvesting and carbon sequestration), it is to be expected that this also holds for Teen Mauza. Researching these trade-offs was not within the scope of my thesis (for reasons of feasibility the distribution of regulating services was not addressed). Further research is thus needed to, for instance, assess the effects of grazing on species diversity and regeneration in the Teen Mauza forest which again might influence multiple regulating services (e.g. carbon sequestration, pollination, pest control etc.).

While, the trade-off between grazing and NTFP production did fall within the scope of my study, it was not possible to empirically study it. This would require an extensive longitudinal study comparing levels of NTFP provisioning before Ajay Das started grazing the forest with current levels of this service. Longitudinal studies of this kind are generally absent from ecosystem services research and research in general. If we really want to understand the links between ecosystems and human wellbeing we need to build on an extensive data base of empirical studies showing interactions among ecosystem services in an as large as possible variety of ecosystems. Assessing this trade-off in my thesis work thus implies extrapolating my field observations on this topic. For this extrapolation I have made use of both the literature available on the topic and the 'public opinion' of the Teen Mauza residents.

As pointed out in the introduction of this thesis, since its formation in colonial times the Forest Department has traditionally seen grazing, and goat grazing in specific, as a livelihood strategy that is inherently destructive for forests. Beyond this general discourse and framing pertaining to the effect of goat grazing on the ecological status of forests, quantitative data of these is rather thin in the literature (Tucker 1986).

In the case of Teen Mauza, discussions with the villagers revealed that they generally agree with the statement that grazing effects the regeneration rate of trees in their community forest, but most of the villagers do not really see this as a problem. None of the community members mentioned that grazing as is seen as a problem for the production of timber or NTFPs. However, it is important to realize that extensive grazing at the current levels has only been practiced here for not even three years, which means that it might be too early to be able to see any ecological trade-off effects. All the respondents did explicitly state, however, that the main problem is the cutting off of branches and small trees for consumption by the young goats of Ajay Das's herd. This cutting off of branches and small trees is strictly forbidden in Teen Mauza (both by the local community, but also according to official Forest Department regulations) and community members feel that it undermines their legitimacy vis-a-vis the forest.

No active management decisions have been made in Teen Mauza in reaction to this trade-off, for instance in the form of grazing bans in certain areas. At the moment, there are no restrictions on grazing, neither for Teen Mauza graziers, nor for outsiders. It is to be expected that in time new regulations will be needed in the community to restore the balance between the use of the forest's fodder provision by the community itself and the negative effects of grazing by outsiders. Still,

the community has made sure that the prohibition of the cutting of branches, although essentially already in place, has been reinforced and Ajay's herders have been asked several times to abide by the community's rules. However, the asymmetric power relation between the community members and Ajay Das as commercial 'absentee herd owner', make it very difficult for the community members to 'manage' the trade-off effects of grazing on NTFP and timber provision. This example shows that even though no explicit management choices have been made, the current bundle of ecosystem services has been and is being shaped by access mechanisms embedded in power relations.

Extrapolating the effect of this trade-off into the future of resource use in the area, taking into account the trade-off table as presented in the theoretical framework (Figure 2.1), it might lead to a (patch-wise) shift in the ecosystem state of Teen Mauza forest into a more woodland-type vegetation (somewhere between dense lopped forest and open tree savannah in the table). In other words, this means that the current situation of unequal ecosystem services use might lead to a shift in the landscape to an ecosystem type in which this skewed bundle of ecosystem services will be ecologically fixed.

Trade-offs between ecosystem services as a concept can thus be instrumental in the disaggregation of benefits obtained from ecosystems from an ecological perspective. Taking a perspective of the biophysical limitations that ecosystems pose for the multiple use of ecosystems, these trade-offs mean that although de facto wellbeing may be derived from a given ecosystem, some people benefit more than others. Also, it implies that the benefits derived by one group, in time, might lead to a farther curtailing of the benefits derived by another group. Combining the notion of trade-offs and the political ecology of the *Theory of Access* can be instrumental for analysing how the shaping forces of the biophysical reality (in the form of trade-offs and synergies between ecosystem services of a certain ecosystem type), and those of the social reality (in the form of social and power relations) together define who is able to benefit from ecosystems and who is not in a continuous dialectic. In this way current resource use can be studied as a historical coproduction of ecosystem trade-offs and power relations. At the same time it is important to study how these power relations can lead to a shifting of the land-use type (e.g. from dense forest to woodland) and thereby set the boundary conditions for future ecosystem service use and its winners and losers. This is not very much highlighted in the *Theory of Access* as it is geared to empirically studying the *current distribution* flows of benefits. Here lies an important avenue for further research, and an important vacancy for political ecologists.

### Increasing participation in ecosystem services research

In generating an alternative approach ecosystem services research, it is important to draw lessons from the *community-based conservation* school, which also focuses at reconciling biodiversity conservation and development. In doing so, the *community-based conservation* school has convincingly argued for the inclusion of local people in biodiversity management conservation (see e.g. Belsky 2008, Brosius *et al.* 2005, Lassoie and Sherman 2010). It has shown that local participation aids biodiversity conservation, because local people often have a lot of conservation-relevant knowledge of the ecosystems they are a part of, and because including them in management simply is more cost-efficient. The literature shows that if one ensures the involvement of the people dependent on the ecosystems to be conserved, not only will the conservation activities likely be more accepted, local people will also be willing to do a lot of the work needed, thereby tailoring conservation to their needs (Brosius *et al.* 2005).

In Teen Mauza, community-initiated conservation takes a central place and in fact is a *prerequisite for the provision and use of ecosystem services*: without the community's self-initiated forest protection, the current bundle of ecosystem services would not have come about. The community's conservation efforts have led to a marked regeneration from shrubland to forest over the last 10 years. My empirical study of community forest management (CFM) in Teen Mauza, reveals that ecosystem services benefiting the global society cannot always be seen as a given, as free services from the natural world. In fact in some cases these services have been actively provided by human effort and *should be seen as social services rather than natural services*. Cases such as Teen Mauza are not isolated, but are common phenomena in countries with a large of forest-dependent population. This highlights the importance of *empirically* studying the sociological context of ecosystem provision and use: to study what enabled and motivated the Teen Mauza people to become free service providers in the first place, to help resolve conflicts that prevent the enactment of better community management, and to support the continuation of this community's active service provision. The case of Teen Mauza and CFM in general, together with the evidence shown by the *community-based conservation* school point out the merits of engaging forest-dependent communities in ecosystem services research and biodiversity conservation.

At the same time, ecosystems services research, through informing policy makers and the cost-benefit analyses they use, acknowledges the right and power of governments to make normative decisions and instigate top down management affecting these communities (see Crane 2010). However, as Crane (2010) points out, local resource users "are themselves also policy makers of a sort". Especially in Teen Mauza where the community has taken the law into own hands by reappropriating the forest that was taken from them by the government, the role of local people as policy makers should not be overlooked. A question that emerges here is: would ecosystem services research, which usually informs generalistic top-down management, if applied to Teen Mauza, actually have disrupted the community protection system (and thus be counter-productive for ecosystem services provision) by alienating the people from the forest they are using and protecting?

I argue that it can be beneficial for ecosystem services research to engender a bottom-up approach in which both ecosystem service knowledge and management plans are generated together with the people who are most directly related to the forests. Taking local needs into account would enable the formulation of better-adapted participatory management systems ensuring the future provision of a both locally and globally desired bundle of ecosystem services with minimal input from national-level policy makers.

### **Ecosystem services, poverty alleviation and equity**

The general concensus in the the literature on forests and livelihoods is that the poor generally are the most forest-dependent, especially when looking at NTFP use (e.g. Neumann and Hirsch 2000, Falconer 1992, Hecht et al. 1988, Jodha 1986). My case study shows that in Teen Mauza this is not the case. The poor, landless labourers from Lakhapada are using substantially less NTFPs from the forest than the tribal people from Akhupadar (who are a lot better-off). Ethnicity is thus a much more influential determinant of forest-dependency in the community than poverty. Informal social control ensures that these poor people do not generate extra income through the sale of NTFPs: doing so would associate them with the lower-ranking tribal culture. This finding has some implications. Assuming that the ecosystem service of NTFP provision provides a viable avenue for poverty alleviation, ensuring this service through management

would automatically contribute to this social outcome. However, increasing this ecosystem service in Teen Mauza would not contribute to poverty alleviation. If ecosystem services really want to contribute to poverty alleviation, it should first of all aim at understanding the ways in which ecosystem services contribute to poverty. My case study shows that people's ability to make use of ecosystems is determined by social and power relations and the informal social control that is related to these. Understanding the sociological embeddedness of ecosystem use is thus a prerequisite for understanding the role of ecosystems in poverty alleviation. The alternative disaggregated approach operationalized in this thesis makes the role of ecosystem services in poverty alleviation researchable. This is an additional important way in which the methodology developed in this thesis can aid ecosystem services research.

Political ecology as a critical social-analytical approach has traditionally had equity issues high on the research agenda. Pertaining to ecosystem services, it is important to ask the question whether ecosystem services in fact are reinforcing existing patterns of inequity in Teen Mauza<sup>23</sup>. In the available time for my thesis research it was not feasible to generate the evidence necessary to address this question, as this would require for instance longitudinal data on income disparities between the different user groups. This data could for instance be used for testing the hypothesis that through being able to make more use of grazing in the Teen Mauza community forest, over the last 2.5 years, Ajay Das has been able to become relatively even more affluent than the community graziers. Longitudinal studies like this, looking at how ecosystem use might have enhanced income and welfare disparities are needed and this is certainly something which should be picked up as an avenue for further research.

However, my fieldwork has generated some evidence to suggest that this hypothesis will be corroborated. Grazing in the Teen Mauza forest has benefitted Ajay more than the average grazer active in the community, as labour is not an access barrier to him. He also has been able to protect himself better from the dis-services that affect him in Teen Mauza (leopard attacks on goats, through hiring specialised herders, and crop damage, through fencing). Although power disparities between Ajay and the community graziers at the outset enabled the former to benefit more from the forest ecosystem than the latter, this evidence suggests that ecosystem services over time have contributed to reinforcing the inequities between Ajay Das and the community members.

This suggestion has several repercussions for ecosystem services research. It means that some specific ecosystem services in some cases reinforce existing inequities, which contrasts with the conventional wisdom in ecosystems services research that ecosystem services are important means of poverty alleviation. The case study evidence justifies putting to question the relation between ecosystem services and equity: is it true that only a selected few of already well-off people are able to significantly benefit from using ecosystem services, while the poorest who really need these benefits are mostly left out? To answer these and related questions many more empirical studies are needed on the relation between people and ecosystems, building toward a comprehensive knowledge base of which ecosystem services in which contexts reinforce societal disparities.

This resituating of ecosystem services research, a proposedly neutral science, in the politics of resource use is needed in order to address a set of broader queries: What does this

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<sup>23</sup> Political ecology as a field of science has had the predisposition to privilege the rights of the poor and marginalized over those of the political elite (Walker 2007). Also, political ecology has been geared to study how environmental change, by placing it in the context of real social and political relationships may "be used to reinforce or challenge those relationships" (Bryant *et al.* 1993: 103).



mean for the often advanced argument that ecosystem services are an avenue of the reconciliation of conservation and development of the poor? What is the (implicit) position of ecosystem service science and researchers in this political debate? Does this necessitate this scientific community to take a pro-poor stance in order to redress the political nature of some ecosystem services?<sup>24</sup>

### Further implications of this research

With this thesis, I argue that the objective of ecosystem services research should not be to advocate conservation by highlighting the (economic) value of the positive externalities that nature provides through pre-set typologies and methodologies, but to *open-endedly analyse* and build an *empirically-grounded understanding* of the actuality of ecosystem services use.

In this, methodology is of crucial importance: as De Graaf and Huberts (2008: 641) point out, explorative and inductive research is needed “when not much is known about the phenomenon that is being researched or when the phenomenon is so complex that neither the variables nor the exact relationship between the variables is fully definable”. I argue that the relationship between human societies and ecosystems is very complex and that, therefore, research on this topic needs to be more inductive and explorative, rather than deductive and aggregated. My thesis shows that empirical political ecology of the sort proposed by Walters and Vayda (2009)<sup>25</sup>, and Ribot and Peluso (2003) forms an avenue for this kind of research on the relations between people and ecosystems and thus could considerably benefit the field of ecosystem services research. Such empirical political ecology inquiry, will bring to light aspects of people’s relation with ecosystems, such as unequal distribution and the social and power relations in which this is embedded, dis-services and trade-offs: aspects which are currently being glossed over in the main body of ecosystem services literature.

While some critical contributions to the ecosystem services literature have pointed out the need for increasing the *empirical* basis of the ecology of ecosystem services, relating these to e.g. resilience theory (Gómez-Baggethun *et al.* 2011) and ecological trade-offs and functional structure (Kremen 2005), very few critical contributions have come from the political ecology community (one noted exception being Daw *et al.*’s (2011) contribution). This thesis builds on Daw *et al.*’s (2011) work, but takes an extra step: it is a first attempt to commensurate ecosystem services research and political ecology through providing a concrete methodology for empirical analytical research on the actuality of ecosystem services use.

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<sup>24</sup> It is interesting to note that, as (Lélé *et al.* forthcoming) point out, equity and social justice have not been incorporated in the human well-being box of the MA framework (see Figure 1.1).

<sup>25</sup> Walters and Vayda (2009: 540) point out that if the analysis lacks empirical verification, “general environmental phenomena such as biodiversity loss, deforestation, or soil erosion represent aggregates of events that (...) are easily misconstrued when presumed to apply to particular cases (...)”.



## 6. Conclusion

This thesis presents an alternative methodology for inquiry into ecosystem services use, based on Ribot and Peluso's (2003) *Theory of Access*: a first step in applying political ecology to ecosystem services. This approach can aid ecosystem services research to gain a better understanding of people's relationship with ecosystems through disaggregating ecosystem-derived benefits and problems. A case study was conducted as a proof of principle: to operationalize and test this new methodology I studied the distribution of ecosystem services and dis-services in Teen Mauza, Odisha, India.

Addressing the first objective of this thesis, the case study shows that ecosystem services use in Teen Mauza is unequal. NTFP, bamboo, and fodder provision and cultural services, and the dis-service of crop damage are unequally distributed among a wide variety of different user groups, including a powerful agricultural entrepreneur from the nearby town. The case study also shows that for all of these services some community members are not at all able to benefit. It displays the small Teen Mauza as a heterogeneous community, which ecosystem services' use cannot be described by a singular indicator for human wellbeing.

Subsequently, I used the Theory of Access to analyse how the found unequal distribution of ecosystem services can be explained in terms of the social and power relations in which it is embedded. The case study highlights the importance of ethnicity and cultural identity, labour availability, and knowledge in the distribution of different people's *ability to benefit* from the forest ecosystem. Proximity to the forest played the largest role in the distribution of ecosystem dis-services.

Within Teen Mauza, access to ecosystem services is determined by social relations and informal social control rather than large disparities in power. Many of the poorest inhabitants of Teen Mauza do not sell NTFPs from the forest to generate extra income, while the tribal people derive a substantial part of their livelihood from NTFP sale. The main reason for this is not that the former are physically prevented from doing so, but that if they would do so, other people in the community would associate them with the lower-ranking tribal culture. The case thus also shows that in Teen Mauza, pertaining to NTFPs, ethnicity is a stronger determinant of forest-dependency than poverty. This observation is contrary to the general consensus in the forest management and livelihoods literature which postulates that the poorest are generally the most forest-dependent.

As to my second objective, this thesis elucidates how an alternative methodology based on the *Theory of Access* can contribute to ecosystem services research: 1) by enabling the disaggregation of human wellbeing in ecosystem services research through studying the actual distribution of flows of benefits, and explaining this in terms of social and power relations, 2) by facilitating research into ecosystem services that is less conceptual and more empirical and open-ended.

Coming back to the third objective of my thesis, some important avenues for further research emerged from my research which can contribute to the further development of the alternative methodology and ecosystem services research in general. This thesis points out that there is a need for longitudinal studies to establish which ecosystem services in which circumstances reinforce inequity patterns in user communities. Also, methodology development is needed to enable a better understanding of trade-offs between ecosystems. For this, long-term studies are needed such as for instance grazing and NTFP provision, or between regulating and

provisioning ecosystem services and how these relate to local development goals. Lastly, studies are needed to establish the differences in distributional effects between different categories of ecosystem services (regulating, provisioning, cultural). The results of the PEFESPA project are expected to provide some first insights into this.

With this thesis, I argue that the objective of ecosystem services research should not be to advocate conservation by highlighting the (economic) value of ecosystem services through pre-set typologies and methodologies, but to *open-endedly analyse* and build an *empirically-grounded understanding* of actual ecosystem services use. Through empirically and open-endedly analysing ecosystem use in Teen Mauza, distributional effects, dis-services, and trade-offs between ecosystems were brought to light. While these concepts have remained unaddressed in the main body of ecosystem services research, the alternative approach operationalized in this thesis makes them researchable. An understanding of the sociological embeddedness of ecosystem use in Teen Mauza also exposed the relationship between ecosystem services and the poor. Hence, the alternative approach presented in this thesis enables an empirical inquiry into the role of ecosystem services in poverty alleviation. It could be used in further research into this aspect of ecosystem services informing how to better integrate biodiversity conservation and poverty alleviation.

The fact that the alternative methodology developed in this thesis brings to light and makes researchable all these aspects of ecosystem services that are normally left unaddressed in ecosystem services research represents an important epistemological point. Namely, there is a need for more reflexivity among ecosystem services practitioners pertaining to the influence of the conceptual model and methodology used on the outcomes of their research. This attitude in turn would facilitate a critical evaluation of its underlying assumptions, such as human wellbeing as something that can be aggregated, and ecosystem services as variables that do not have relations with one another. Without addressing these assumptions it is impossible to overcome the central challenge that ecosystem services research is facing: the reconciliation of biodiversity conservation and poverty alleviation and development.

Addressing this challenge requires knowing much more about the social-ecological systems of our world than we currently do. The alternative methodology operationalized in this thesis can contribute to a growing empirical understanding of the sociological and ecological context of ecosystem services use around the globe and its relation to poverty and development.

## References

1. Agrawal, A., and Gibson, C. C. 1999. Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World development* 27:629-649.
2. Ahenkan, A., and Boon, E. 2011. Non-Timber Forest Products (Ntfps): Clearing the Confusion in Semantics. *Journal of Human Ecology-New Delhi* 33:1-9.
3. Belsky, J. M. 2008. Creating Community Forests, in *Forest Community Connections: Implications for Research, Management, and Governance*. Edited by E. M. Donoghue and V. E. Sturtevant, pp. 219-242. Washington DC: RFF Press.
4. Bennett, E. M., Peterson, G. D., and Gordon, L. J. 2009. Understanding Relationships among Multiple Ecosystem Services. *Ecology Letters* 12:1394-1404.
5. Bhullar, L. 2008. The Indian Forest Rights Act 2006: A Critical Appraisal. *Law Environment and Development Journal* 4:20-35.
6. Biersack, A. 2006. Reimagining Political Ecology: Culture/Power/History/Nature, in *Reimagining Political Ecology*. Edited by A. Biersack and J. Goodman, pp. 3-42. London: Duke University Press.
7. Blaikie, P., and Brookfield, H. 1987. Defining and Debating the Problem, in *Land Degradation and Society*. Edited by P. Blaikie and H. Brookfield, pp. 1-26. London: Methuen
8. Bose, P., Arts, B., and van Dijk, H. 2012. 'Forest Governmentality': A Genealogy of Subject-Making of Forest-Dependent 'Scheduled Tribes' in India. *Land Use Policy* 29:664– 673.
9. Brosius, J. P., Tsing, A. L., and Zerner, C. 2005. *Communities and Conservation: Histories and Politics of Community-Based Natural Resource Management*. Walnut Creek, CA, USA: Altamira Press.
10. Bryant, R. L., Rigg, J., and Stott, P. 1993. Introduction: Forest Transformations and Political Ecology in Southeast Asia. *Global Ecology and Biogeography Letters* 3:101-111.
11. Carpenter, S. R., Mooney, H. A., Agard, J., Capistrano, D., DeFries, R. S., Díaz, S., Dietz, T., Duraipappah, A. K., Oteng-Yeboah, A., and Pereira, H. M. 2009. Science for Managing Ecosystem Services: Beyond the Millennium Ecosystem Assessment. *Proceedings of the National Academy of Sciences* 106:1305-1312.
12. Census of India. 2001. Census of India 2001. Accessed on 20th May: <http://censusindia.gov.in/>.
13. Chopra, K., and Dasgupta, P. 2008. *The Nature of Household Dependence on Common Pool Resources: An Empirical Study in India*. Institute of Economic Growth, : New Delhi, India.
14. Conroy, C., Mishra, A., and Rai, A. 2002. Learning from Self-Initiated Community Forest Management in Orissa, India. *Forest Policy and Economics* 4:227-237.
15. Conway, T., Moser, C., Norton, A., and Farrington, J. 2002. *Rights and Livelihoods Approaches: Exploring Policy Dimensions, Natural Resource Perspectives*, vol. 78. Edited by J. Farrington, pp. 6. London: Overseas Development Institute.
16. Crane, T. A. 2010. Of Models and Meanings: Cultural Resilience in Social-Ecological Systems. *Ecology and Society* 15:19.
17. Daw, T., Brown, K., Rosendo, S., and Pomeroy, R. 2011. Applying the Ecosystem Services Concept to Poverty Alleviation: The Need to Disaggregate Human Well-Being. *Environmental Conservation* 38:370-379.
18. De Graaf, G., and Huberts, L. W. J. C. 2008. Portraying the Nature of Corruption Using an Explorative Case Study Design. *Public Administration Review* 68:640-653.
19. Department of FARD. nd. *Perspective Plan 2010-2020 Ard Sector*. Government of Odisha Department of Fisheries & Animal Resources Development. Bhubaneswar. Web page: <http://orissaahvs.com/File/perspective%20plan.pdf>, accessed on 17th April 2012.
20. Dhal, N. B. 2003. *District Gazetteer of Angul*. Office of the Collector & District Magistrate. Angul, India. Web page: <http://angul.nic.in/fore.htm>, accessed on 14th April 2012.
21. Dunn, R. R. 2010. Global Mapping of Ecosystem Disservices: The Unspoken Reality That Nature Sometimes Kills Us. *Biotropica* 42:555-557.
22. Egoh, B. N., Reyers, B., Carwardine, J., Bode, M., O'FARRELL, P. J., Wilson, K. A., Possingham, H. P., Rouget, M., De Lange, W., and Richardson, D. M. 2010. Safeguarding Biodiversity and Ecosystem Services in the Little Karoo, South Africa. *Conservation Biology* 24:1021-1030.

23. Falconer, J. 1992. A Study of the Non-Timber Forest Products of Ghana's Forest Zone, in *The Rainforest Harvest: Sustainable Strategies for Saving the Tropical Forests?* Edited by S. Cousell and T. Rice, pp. 135-141. London: Friends of the Earth.
24. Firth, R. 1972. The Sceptical Anthropologist?: Social Anthropology and Marxist Views on Society. *Proceedings of the British Academy* 58:3-39.
25. Frank, A. G. 1967. *Capitalism and Underdevelopment in Latin America* New York: Monthly Review Press.
26. Gadgil, M., and Guha, R. 1995. *Ecology and Equity: The Use and Abuse of Nature in Contemporary India*: Burns & Oates.
27. Gómez-Baggethun, E., Alcorlo, P., and Montes, C. 2011. Ecosystem Services Associated with a Mosaic of Alternative States in a Mediterranean Wetland: Case Study of the Doñana Marsh (Southwestern Spain). *Hydrological Sciences Journal* 56:1374-1387.
28. Gómez-Baggethun, E., De Groot, R., Lomas, P. L., and Montes, C. 2010. The History of Ecosystem Services in Economic Theory and Practice: From Early Notions to Markets and Payment Schemes. *Ecological Economics* 69:1209-1218.
29. Grover, R. 1997. *Draft Paper: Beyond Forest Boundaries. Peoples, Markets, and the State in Himalayan Punjab, 1850-1925, Peasant Symposium*, pp. 1-39. Charlottesville: University of Virginia.
30. Hammersley, M., and Atkinson, P. 2007. *Ethnography: Principles in Practice*. New York: Routledge.
31. Hecht, S. B., Anderson, A. B., and May, P. 1988. The Subsidy from Nature: Shifting Cultivation, Successional Palm Forests, and Rural Development. *Human Organization* 47:25-35.
32. Howard, M. C., and King, J. E. 1975. *The Political Economy of Marx*, 2nd edition. Harlow Essex: Longman group UK.
33. Jansen, K., and Vellema, S. 2011. What Is Technography? *NJAS-Wageningen Journal of Life Sciences* 57:169-177.
34. Jodha, N. S. 1986. Common Property Resources and Rural Poor in Dry Regions of India. *Economic and political weekly* 21:1169-1181.
35. Khare, A., Sarin, M., Saxena, N., Palit, S., Bathla, S., Vania, F., and Satyanarayana, M. 2000. *Joint Forest Management: Policy, Practice and Prospects: India Country Policy That Works for Forest and People*. International Institute for Environment and Development (IIED), : London.
36. Kornel, D., Mohapatra, S. C., and Acharya, R. M. nd. *Sheep and Goat Genetic Resources of Orissa*. Intercooperation Delegation, Indo-Swiss Natural Resources Management Programme Orissa: Hyderabad.
37. Kremen, C. 2005. Managing Ecosystem Services: What Do We Need to Know About Their Ecology? *Ecology Letters* 8:468-479.
38. Larson, A. M., and Ribot, J. C. 2007. The Poverty of Forestry Policy: Double Standards on an Uneven Playing Field. *Sustainability Science* 2:189-204.
39. Lassoie, J., and Sherman, R. 2010. Promoting a Coupled Human and Natural Systems Approach to Addressing Conservation in Complex Mountainous Landscapes of Central Asia. *Frontiers of Earth Science in China* 4:67-82.
40. Lélé, S. 1994. Sustainable Use of Biomass Resources: A Note on Definitions, Criteria, and Practical Applications (1). *Energy for Sustainable Development* 1:42-46.
41. —. 2009. Watershed Services of Tropical Forests: From Hydrology to Economic Valuation to Integrated Analysis. *Current Opinion in Environmental Sustainability* 1:148-155.
42. Lélé, S., Springate-Baginski, O., Lakerveld, R., Deb, D., Dash, P., Datta, A., and Sarin, M. forthcoming. Ecosystem Services: Origins, Contributions, Pitfalls, and Alternatives. *Conservation and Society*.
43. Little, P. D. 1985. Absentee Herd Owners and Part-Time Pastoralists: The Political Economy of Resource Use in Northern Kenya. *Human Ecology* 13:131-151.
44. Lundholm, B. 1976. Domestic Animals in Arid Ecosystems. *Ecological Bulletins* 24:29-42.
45. Maharatna, A. 1998. *On Tribal Fertility in Late Nineteenth and Early Twentieth Century India*. Harvard Center for Population and Development Studies, Harvard University: Cambridge, MA, USA.
46. Marsden, T., Munton, R., Ward, N., and Whatmore, S. 1996. Agricultural Geography and the Political Economy Approach: A Review. *Economic Geography* 72:361-375.

47. Millennium Ecosystem Assessment (MA). 2003. *Ecosystems and Human Well-Being: A Framework for Assessment*. Vol. 1. *The Millennium Ecosystem Assessment Series*. Washington, DC: Island Press.
48. —. 2005. *Ecosystems and Human Well-Being: Synthesis*. *The Millennium Ecosystem Assessment Series*. Washington D.C.: Island Press.
49. Mishra, S. 2007. Household Livelihood and Coping Mechanism During Drought among Oraon Tribe of Sundargarh District of Orissa, India. *Journal of Social Science* 15:181-186.
50. Mitra, A. 2008. The Status of Women among the Scheduled Tribes in India. *Journal of Socio-Economics* 37:1202-1217.
51. Nandi, D., Roy, S., Bera, S., Kesh, S. S., and Samanta, A. K. 2011. The Rearing System of Black Bengal Goat and Their Farmers in West Bengal, India. *Veterinary World* 4:254-257.
52. Nayak, P. K. 2006. Politics of Co-Optation: Self-Organized Community Forest Management and Joint Forest Management in Orissa, India. Master's Thesis Natural Resource Management, University of Manitoba, Canada.
53. Nelson, E., Mendoza, G., Regetz, J., Polasky, S., Tallis, H., Cameron, D. R., Chan, K. M. A., Daily, G. C., Goldstein, J., and Kareiva, P. M. 2009. Modeling Multiple Ecosystem Services, Biodiversity Conservation, Commodity Production, and Tradeoffs at Landscape Scales. *Frontiers in Ecology and the Environment* 7:4-11.
54. Neumann, R. P., and Hirsch, E. 2000. *Commercialisation of Non-Timber Forest Products: Review and Analysis of Research*. Jakarta: CIFOR.
55. Newing, H., Eagle, C. M., Puri, R. K., and Watson, C. W. 2011. *Conducting Research in Conservation: Social Science Methods and Practice*. London: Routledge.
56. Norgaard, R. B. 2010. Ecosystem Services: From Eye-Opening Metaphor to Complexity Blinder. *Ecological Economics* 69:1219-1227.
57. Odisha Space Applications Centre (ORSAC). 2012. Odisha Sampad Block Level Gis Atlas. Accessed on 15th March 2012: <http://www.odishasampad.in/>.
58. PPTA Consultants. 2007. *Irrigated Agriculture Sector Review and Investment Strategy*. TA-4815-IND. Asian Development Bank.
59. Raudsepp-Hearne, C., Peterson, G., and Bennett, E. 2010. Ecosystem Service Bundles for Analyzing Tradeoffs in Diverse Landscapes. *Proceedings of the National Academy of Sciences* 107:5242.
60. Ribot, J. C. 1998. Theorizing Access: Forest Profits Along Senegal's Charcoal Commodity Chain. *Development and Change* 29:307-341.
61. Ribot, J. C., and Peluso, N. L. 2003. A Theory of Access. *Rural sociology* 68:153-181.
62. Robbins, J. 2006. Ownership in a Papua New Guinea Society, in *Reimagining Political Ecology*. Edited by A. Biersack and J. Greenberg, pp. 419. Durham: Duke University Press.
63. Roseberry, W. 1988. Political Economy. *Annual Review of Anthropology* 17:161-185.
64. Sarin, M., Singh, N. M., Sundar, N., and Bhogal, R. K. 2003. *Devolution as a Threat to Democratic Decision-Making in Forestry?: Findings from Three States in India*. Overseas Development Institute: London.
65. Singh, K. D., Singh, J. P., and Sinha, B. nd. *Trends in Forest Ownership, Forest Resource Tenure and Institutional Arrangements: Are They Contributing to Better Forest Management and Poverty Reduction? A Case Study from Orissa, India*. ATREE and Orissa Forest Department: New Delhi.
66. Singh, K. D., Sinha, B., and Mukherji, S. D. 2005. *Exploring Options for Joint Forest Management in India*. FAO: Rome.
67. Springate-Baginski, O. 2010. Integrating Forest Ecosystem Service Assessment with Pro-Poor Governance in India. Research proposal within Ecosystem Services and Poverty Alleviation (ESPA) Programme. Research Proposal, Department of Development Studies, University of East Anglia, Norwich.
68. Swallow, B. M., Sang, J. K., Nyabenge, M., Bundotich, D. K., Duraiappah, A. K., and Yatich, T. B. 2009. Tradeoffs, Synergies and Traps among Ecosystem Services in the Lake Victoria Basin of East Africa. *Environmental science & policy* 12:504-519.
69. Thomas-Slaytor, B., and Rocheleau, D. 1995. Gender, Resources, and Local Institutions: New Identities for Kenya's Rural Women, in *Gender, Environment and Development in Kenya: Perspectives from the Grassroots*. Edited by B. Thomas-Slaytor and D. Rocheleau, pp. 7-22. Boulder: Lynn Rienner.

70. Tripathi, S., and Singh, K. 1994. Productivity and Nutrient Cycling in Recently Harvested and Mature Bamboo Savannas in the Dry Tropics. *Journal of applied ecology* 31:109-124.
71. Troy, A., and Wilson, M. A. 2006. Mapping Ecosystem Services: Practical Challenges and Opportunities in Linking Gis and Value Transfer. *Ecological Economics* 60:435-449.
72. Tucker, R. P. 1986. The Evolution of Transhumant Grazing in the Punjab Himalaya. *Mountain Research and Development*:17-28.
73. Van Beukering, P. J. H., Cesar, H. S. J., and Janssen, M. A. 2003. Economic Valuation of the Leuser National Park on Sumatra, Indonesia. *Ecological Economics* 44:43-62.
74. Vedeld, P., Angelsen, A., Bojö, J., Sjaastad, E., and Kobugabe Berg, G. 2007. Forest Environmental Incomes and the Rural Poor. *Forest Policy and Economics* 9:869-879.
75. Waddington, D. 2004. Participant Observation, in *Essential Guide to Qualitative Methods in Organizational Research*. Edited by C. Cassel and G. Symon, pp. 154-164. London: Sage Publications.
76. Walker, P. A. 2005. Political Ecology: Where Is the Ecology. *Progress in Human Geography* 29:73-82.
77. —. 2007. Political Ecology: Where Is the Politics? *Progress in Human Geography* 31:363.
78. Wallerstein, I. 1974. *The Modern World System. Vol. 1, Capitalist Agriculture and the Origins of the European World Economy*: New York: Academic Press.
79. Walters, B., and Vayda, A. 2009. Event Ecology, Causal Historical Analysis, and Human-Environment Research. *Annals of the Association of American Geographers* 99:534-553.
80. Watts, M. 1983. *Silent Violence: Food, Famine and Peasantry in Northern Nigeria*. Berkeley: University of California Press.
81. —. 2000. Political Ecology, in *A Companion to Economic Geography*. Edited by E. Sheppard and T. Barnes, pp. 257-274. Oxford: Blackwell Publishers.
82. Wolf, E. 1982. *Europe and the People without History*. Berkeley: University of California Press.
83. Yadama, G. N., Pragada, B. R., Pragada, R. R., Cheng, T. L., and Durst, P. B. 1997. *Forest Dependent Survival Strategies of Tribal Women: Implications for Joint Forest Management in Andhra Pradesh, India*. FAO: Bangkok.
84. Zhang, W., Ricketts, T. H., Kremen, C., Carney, K., and Swinton, S. M. 2007. Ecosystem Services and Dis-Services to Agriculture. *Ecological Economics* 64:253-260.

## **Annex A: The PEFESPA project**

The Political Ecology of Forest Ecosystem Services and poverty Alleviation (PEFESPA) project is a two-year project. It is a combined initiative of the Department of Development Studies of the University of East Anglia (UEA), the Forest and Governance programme at ATREE, Bangalore, and Vasundhara, Bhubaneswar, funded by the U.K. based National Environmental Research Council (NERC). The Principle investigators of the project are Dr. Oliver Springate-Baginski of UEA, and Dr. Sharachchandra Lélé of ATREE, and the co-investigators are the independent researchers Dr. Debal Deb and Ms. Madhu Sarin, and Dr. Prasad Dash of Vasundhara.

The main objectives of the project are:

- “1. To generate insights into the nature and magnitude of tradeoffs between forest ecosystem services and service users or rights holders under different management regimes,
2. To understand the influence of changes in rights, institutional arrangements and larger governance mechanism on the distribution of ecosystem services, especially on the poor,
3. To develop a conceptual framework and methodology that incorporates the core concepts of ecological complexity, tradeoffs and institutions into an assessment framework.”

(Adapted after Springate-Baginski, 2010)

The research conducted within the project will combine the largely natural science and economics dominated ecosystem services research agenda with that of the political ecology of access to natural resources. This inter-disciplinary approach will combine ecosystem functioning, economic and non-economic valuation and the politics of access and control over natural resources with special attention for the poor. The main focus will be on methodology development in order to contribute to and provide a framework of assessment to the ongoing research and to facilitate more inter-disciplinarity in this field of science. Also, institutional insights gained will be fed into the ongoing debate on community forestry in India in the form of policy recommendations (Springate-Baginski 2010).

The developed methodology will be illustrated and tested in a comprehensive 1.5 year multiple-case study in the tribal-inhabited forests of Orissa State, India. Within each case study the flow of the bundle of ecosystem services will be mapped and their distribution among different stakeholders assessed. Inter-case comparison will enable a comparison across the different forest management regimes of Community Forest Management, Forest Department-dominated Reserve Forest, and Protected Area management.

Special attention will be given to trade-offs between ecosystem services across different management regimes and their effects on (the equitable distribution among) service beneficiaries. Also, the project will assess the role of ecosystem dis-services, and trade-offs between ecosystem services.

## Annex B: The historical development of forest management in India

After the nationalization and monopolization of most of the Indian forests under colonial rule (the majority forests having been brought under State control as 'Reserve Forests', reserved for commercial timber exploitation), Indian forest management, based on the European model of scientific forestry (Bose *et al.* 2012), continued to be very hierarchical and State-controlled in Independent India. The Forest Department remained the proprietor of most of the forests on the subcontinent (Singh *et al.* 2005). Just as before Independence, the Forest Department kept on prioritizing national timber and revenue requirements over the satisfaction of local needs, and technically managed plantation forests over natural, mixed ones (Singh *et al.* 2005). There was no role for local forest-dependent communities in forest management and "forest systems continued to function administratively and technically on the model of colonial times" well into the second half of the 20<sup>th</sup> century (Singh *et al.* 2005: 5).

Bose *et al.* (2011: 669) argue that the history of forest management in India can be characterized as a continuous struggle between the State and forest-dependent and tribal people. Moreover the authors point out that the political subjectification of tribal people should be understood in the light of the classification of these as "new ethnic groups", while their "customary forestlands and rights" were completely disregarded (Bose *et al.* 2011). The Forest Department has thus traditionally been suspicious of the claims of forest-dependent peoples (Bhullar 2008) and has seen their interests as antagonistic to the national interest. This attitude and management approach has led to the alienation of tribal and other forest-dependent people from their ancestral forest lands (Bhullar 2008).

In India this antagonism against forest-dependent people is all the more problematic, because a very large number of people fall within the category of forest-dependent people: according to Khare *et al.* (2000) approximately 200 million Indian people are partially or wholly dependent on forest resources for their sustenance and livelihoods. Moreover, an estimate by Chopra and Dasgupta (2008) indicates that a total of 36 percent of all Indian households are dependent, even on a daily basis, on forests for fuel wood collection.

The National Forest Policy of 1988 can be seen as a historical turn in the approach to forest management in India, as for the first time it officially recognized the "need to involve tribal communities in the management of forest" (Bhullar 2008: 23). The Ministry of Forests and Environment sought to implement the policy by regularizing customary ownership rights of forest-dwelling tribal communities. However, as Bhullar (2008: 23) mentions "this people-oriented process was never implemented on the ground".

At the same time, Joint Forest Management (JFM) also arose from the 1988 policy (as in the (revised) Government of India resolution on JFM 1990). This management approach, based on the sharing of management responsibilities as well as forest-derived profits between the Forest Department and forest-dependent communities rapidly become very wide-spread in the Indian forests as it was very much in line with the existing hierarchical structure of State-controlled forest-management (Sarin *et al.* 2003, Singh *et al.* nd).

The 1990 JFM resolution described which rights over forest produce were to be devolved to local communities, their share in the final harvest revenues of timber, and their role in the preparation of micro-plans for forest management. The guidelines also ensured the participation of women in forest management (Singh *et al.* 2005). The big difference with the ambitious National Forest Policy, however, was that within the JFM framework forest land titles were not being transferred to the communities, and that the Forest Department kept on having the final say when it came to management decisions. Also, as the Forest Department's organization and



structure had hardly changed since colonial times, foresters were still only trained to be technical managers of the forests and had no training or experience whatsoever when it came to facilitating community-based management (Sarin *et al.* 2003, Singh *et al.* nd).

### *Forest management in Odisha*

The state of Odisha has a tropical climate and forest cover of about 30%, which is composed of tropical moist deciduous, tropical dry deciduous, tropical semi-evergreen, and sub-tropical broad-leaved hill forests (Conroy *et al.* 2002). While most of these forests were nationalized by the colonial regime and coined *Reserved Forests*, some forests were still in the hands of princes and landlords up to Independence. The new Indian State annexed these forests and declared those without any management systems *Reserved Forests* and those which had some management in place *Protected Forests*.

Just as is the case in Ranpur, Reserve Forests in Odisha are generally large in patch size and are usually surrounded by multiple forest-dependent villages: in these forests all customary rights have been institutionally ignored, and no formal rights have been recorded. However, upon permission, collection of Non Timber Forest Products (NTFPs) has been allowed in most cases. In practice this means that generally the collection of dry wood for fuel and some NTFPs such as tubers and forest fruits has been tolerated. Protected Forests in Odisha are interspersed with villages and are patchy in their distribution. They often fall within the geographical boundaries of Revenue Villages (the colonial name for villages from which tax was extracted), and therefore most of these forests are considered village forests, with active management systems mostly run by single villages (Singh *et al.* nd). Hence, the Forest Department's influence in these forests is and has been much less than in Reserve Forests.

In 1993, the Odisha State branch of the Forest Department issued its most influential JFM resolution, describing the details of the sharing of management responsibilities as well as forest-derived revenue between the Forest Department and (tribal) communities (Singh *et al.* 2005). This resolution granted a share of 50% of revenue from timber to registered JFM communities and enabled lawful use of Non Timber Forest Products and fuel wood (such as tubers, fruits, honey and mushrooms). The Forest Department remained in control of the formation of the JFM committees, which in Odisha were called *Vana Samrakhana Samitis* (VSSs) (Sarin *et al.* 2003). The total number of JFM committees in Odisha was reported to be 6,822 by 2005 and together these were protecting a forest area of approximately 652,000 hectares (Singh *et al.* nd).

In Odisha especially many doubts exist as to the Forest Department's intentions for implementing JFM, since out of the approximately 2,000 VSSs formed in Odisha until 2000, some 1,500 were pre-existing Community Forest Management (CFM), or informal, community-initiated forest management committees which were formalized into JFMs (Sarin *et al.* 2003). Most of these committees were being convinced to convert to JFM because of the Forest Department's promises of funding, while they were not well informed about their diminished influence in the management of their forests (and the transfer of much decision-making power to the Forest Department). Therefore, the quick conversion of many Community Forest Management initiatives into JFM committees is seen by many critical scholars as a strategy of the Forest Department to expand its reach and to regain control over previously only marginally managed forest areas (Nayak 2006, Sarin *et al.* 2003).

Considering Community Forest Management, Odisha has the highest density of self-initiated forest management systems anywhere in the world (Conroy *et al.* 2002). The vast majority of these CFMs was established from the late 1970's onward and can be seen as a reappropriation by

communities of the nationalized forests they traditionally depended on for fuel wood, bamboo and NTFPs. These management systems are often based on a daily protection of the forest by either community members themselves or a paid guard and in some cases these communities even protect the forest against timber harvesting by the Forest Department itself (or against commercial exploiters sanctioned by it).

Since these management systems are not formally recognized by the Indian government there is a large variation in the estimations of actual numbers and only a small minority of these initiatives has actually been documented (Singh *et al.* 2005). Sarin *et al.* (2003) estimate that there are over 5000 CFM initiatives in Odisha, but Vasundhara, an Odishan NGO estimates that there, in total, are some 12,000 active CFM committees in the state (pers. com. G. Rao November 2011). Singh *et al.* (2005) estimate that up to 75 percent of the existing CFM committees were formed in the last 15 years. The researchers attribute this remarkable increase to the strength of the “demonstration effect”: people start protecting their forests after having seen the merits of community forest management at neighbouring villages.

Over the years, realizing that their initiatives have no legal basis, CFM committees have clustered themselves into federations on Block, District and even State level (Singh *et al.* unknown), in order to create a network of mutual support and to increase their negotiation position vis-a-vis the Forest Department. Many of these groups realize that the Forest Department is a necessary negotiation partner (and in some cases has even been supportive of their forest protection initiative), but are not willing to convert to Forest Department controlled JFM committees (Singh *et al.* nd).

CFM communities, such as Teen Mauza wield convincing arguments for resisting the conversion to JFM. Conroy *et al.* (2002) mention the following points: JFM’s lack mutual accountability, communities being much more accountable to the Forest Department than vice versa; JFM is too rigid and formal, with no room for flexibility or plurality; JFM management plans tend to reflect the Forest Department’s agenda rather than community needs, and they are based on technical silvicultural management; JFM design is attuned to conventional plantation forestry and is not appropriate to the multi-species, multi-purpose community forestry; JFMs have been implemented in a target-driven way, without any thorough deliberation with the communities involved. Furthermore, after a community has been protecting a CFM patch of forest for years, JFM policy prescribes that from the date of registration onwards the Forest Department is entitled to 50 percent of the timber revenue, which means a big loss for the community (Sarin *et al.* 2003).

## **Annex C: An estimate of the sustainability of the bamboo provision service**

The PEFESPA team assessed that the Teen Mauza CFM area has a bamboo coverage of around 30 per cent, which means a total bamboo area of 75 acres (out of a total of 250 acres). The bamboo provision service that in theory can be (sustainably) obtained from this area is equal to the annual above-ground biomass increment of the bamboo clumps in this area (assuming no use by the ecosystem itself). Taking Tripathi and Singh's (1994) value of the annual increment of five-year-old *Dendrocalamus strictus* of 9.48 Mg./ha./year (corresponding to 3.84 Mg acre<sup>-1</sup> yr<sup>-1</sup>), the Teen Mauza CFM area would produce 288 Mg. of bamboo biomass annually. Assuming that a bundle of bamboo weighs about 40 kg., the total weight of bamboo taken from the forest is 23.5 Mg. (587 bundles multiplied by 40), which is still far below the annual increment (it is not even 10% of the maximum sustainable harvest). Thus, even including the 4.5 times larger harvesting rate of the Scheduled Caste basket makers (hypothesizing that they would be getting all their bamboo from Teen Mauza forest), the total harvest as shown in Table 4.3.1 would still be much lower than the maximum sustainable use.

## Annex D: Household Survey

### Household Survey PEFESPA

Date:

Enumerator:

No answer/Mistake=99

Village name (& hamlet name if any)	
Household number (from HH list)	

#### 1. Household demography, occupation and assets

##### 1.1. Household demography:

Name of head:

Person who answered:

Caste/tribe of head (1.1.1)	
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Household member	Name (of first 6 household members) (1.1.3)	Age (years) (1.1.4)	Sex (M-1, F-2) (1.1.5)	Relationship to head (CODES) (1.1.6)	Level of education (1.1.7)
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					

9.					
10.					

Household member	Village-based occupation (CODES) (1.1.8)	
	Primary (months/year)	Secondary (months/year)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

**Codes:**

**Relationship to head:** 1-Self, 2-Wife/husband, 3-Child, 4-Brother/sister, 5-Father/mother, 6-Other relatives

**Level of education:** 0-Uneducated, 1-Primary, 2-Secondary, 3-Higher

**Occupation:** 1-Farming, 2-Forest collection for sale, 3-Livestock rearing, 4-Wage labour (MNREGA), 5-Small-scale business/trade/manufacturing, 6-Salaried employment, 7-Other, namely...

**1.2 Non village-based employment and residence/seasonal migration**

How many of the household members seasonally travel to and live in different places to earn money for the household? (1.2.1)	Sex (M-1, F-2) (1.2.2)	Type of work (CODES) (1.2.3)	Location of work (CODES) (1.2.4)

**Codes by column:**

**Type of work:** 1-Agriculture, 2-Construction, 3-Industry, 4-Porter, 5-Other, namely...

**Location of work:** 1-Within State, 2-Outside State

### 1.3 Assets

Type of asset	Presence and quantity (1.3.1)
a. Two wheeler	
b. Tractor, harvester, thresher	
c. House (katcha/laterite blocks/pucca)	
d. TV	
e. Salaried job/business (anyone in HH)	
f. Other, namely...	

### 1.4 Land ownership

	Type	Area (unit)	Crop type
<b>a. Own land</b>	Dry		
	Wet/Irrigated		
	Plantation		
	Fallow (short)		
	Fallow (long)		
<b>b. Leased in/Sharecropping</b>			
<b>c. Leased out</b>			
<b>d. Encroached land</b>			

## 2. Livestock grazing and fodder collection

### 2.1 Livestock grazing

Type of livestock	Number of livestock (2.1.1)	Who grazes them? (CODES) (2.1.2)	Where do they graze? (CODES) (2.1.3)	How much labour time is spent on grazing? (hours/week) (2.1.4)
a. Bullocks				
b. Cows				
c. Buffaloes				
d. Cross-breeds				
e. Goats				
f. Sheep				
g. Other, namely...				

### 2.2 Fodder and bedding

Does your family also collect fodder? (Yes-1, No-2) (2.2.1)	Where is the fodder being collected? (CODES) (2.2.2)	How much is collected? (unit) (2.2.3)	Where is the bedding being collected? (CODES) (2.2.4)	Frequency (2.2.5)	Quantity leaf litter used for animal bedding (unit) (2.2.6)

Rules/fees and constraints regarding grazing and collection (access/dispute) (2.2.7)

#### Codes by column:

**Who grazes them?:** 1-HH men, 2-HH women, 3-HH-children, 4-Paid graziers

**Where do they graze?:** 1-Revenue land, 2-CFM area, 3-Inside other village's CFM boundary, namely ....., 4-Private agricultural land

**Where is the fodder being collected?:** 1-Revenue land, 2-CFM area, 3-Reserve Forest (outside CFM boundaries), 4-Private agricultural land

**Where is the bedding being collected?:** 1-Revenue land, 2-CFM area, 3-Reserve Forest (outside CFM boundaries), 4-Private agricultural land

### 3. Cultural Services

	Cultural reasons do you visit the forest? (puja, picnic, individual visit, look-out point, etc.) (3.1)	Frequency (3.2)	Scale of the event (Household-1, Community-2) (3.3)	Location of sites (CODES) (3.4)	Who all go? (M-1, F-2, C-2) (3.5)	Constraints regarding spiritual/cultural sites (access/dispute) (3.6)
a.						
b.						
c.						
d.						
e.						

**Codes:**

**Location of site:** 1-Revenue land, 2-CFM area, 3-Reserve Forest (outside CFM boundaries)

### 4. Ecosystem Dis-services

#### 4.1 Crop damage

Animal species	Crop damage in 2011 (Yes-1, No-2) (4.1.1)	Type of crop	Frequency (4.1.2)	Percentage of harvest lost (4.1.3)	Percentage of harvest lost in 2010 (4.1.3)	Means of crop protection (CODES) (4.1.6)
a. Wild boar						
b. Peacock						
c. Monkey						
d. Wild buffalo						
e. Elephant						
f. Other, namely...						

**Codes:**

**Means of crop protection:** 0-None, 1-Household guard, 2-Other, namely...



#### 4.2 Episodic events

Crop damage by <i>elephants</i> in last five years ( <b>Yes-1, No-2</b> ) (4.2.1)	Type of crop (4.2.2)	Percentage of harvest lost (4.1.3)

### 5. Forest protection

#### 5.1 Participation in Community Forest Management activities

Part of protection community?	
If not, why?	
FPC member?	
Thengapalli ( <b>days/month</b> )	
If not at all, why?	
If not at all, any payment/contribution?	
If yes, who goes? ( <b>M-1, F-2</b> )	
What if you miss one palli?	
If missed, any payment/contribution made?	
Paid guard? Household payment (if any)?	

## Fuel wood, timber and NTFP Survey

### 1.1 Fuel wood, timber and bamboo collection

Type	Who collects? (M-1, F-2) (1.1.1)	Why collected? (Household consumption-1, Sale-2, Both-3) (1.1.2)	Quantity (units/week) (1.1.3)	Larger quantities/stock occasionally (unit - fuel wood only)? (1.1.4)	Time needed for collection (hours/week) (1.1.5)	Round trip traveling distance (km.) (1.1.6)	Where collected (CODES) (1.1.7)	If bought, at what price? (unit) (1.1.8)
Fuel wood								
Bamboo (green/dry)								
Poles								
Timber for furniture								
Timber for house construction								
Timber for other purposes								
Agricultural implements								
...								
...								
...								

**Codes by column:**

**Where collected:** 1-Revenue land, 2-CFM area, 3-Reserve Forest (outside CFM boundaries), 4-Private land

**1.2 Fuel wood, timber and bamboo - Rules and Constraints**

Type	Rules for collection & any fees paid? ( <b>community fee, FD fee</b> ) (1.2.1)	Constraints regarding collection, use and sale (access/quality/dispute) (1.2.2)
Fuel wood		
Bamboo (green/dry)		
Poles		
Timber for furniture		
Timber for house construction		
Timber for other purposes		
Agricultural implements		
...		
...		
...		

**1.3 Medicinal plants**

List 5 main species (1.3.1)	
Who collects ( <b>M-1, F-2</b> ) (1.3.2)	
Over the last two years, what critical diseases have been remediated? (1.3.3)	
Constraints regarding collection, use and sale (access/quality/dispute) (1.3.4)	

#### 1.4 Other NTFPs

	Collected (Yes-1, No-2)? (1.4.1)	Who collects? (M-1, F-2, C-3) (1.4.2)	Quantity own use (1.4.3)	Quantity for sale (year) (1.4.4)	Effort (person hours) (1.4.5)	Period of collection (days/year) (1.4.6)	If sold, for what price (Rs./unit)? (1.4.7)	Collected from outside CFM boundary?
Kendu leaves								
Siali leaves								
Sal leaves								
Sal seeds								
Oil seeds								
Honey								
Fruits/vegetables								
Bushmeat/fish								
Tubers								
Mushrooms								
Mahua flowers (Mohula)								
Mahua fruits								
Others								
...								
...								

**1.5 NTFPs – Constraints**

<p><b>Constraints regarding collection, use &amp; sale</b></p>	
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## **Annex E: Informed consent letter**

**With your permission I would like to conduct some research in this village. Would you like to help me with this?**

Let me introduce myself: My name is Roan Lakerveld and I am an MSc social sciences/anthropology student from the Netherlands (Wageningen University).

Together with some NGOs and research institutes, among which Vasundhara organization, I am conducting a study in Ranpur block, Orissa. My research, which is a small part of the larger project, focuses on certain aspects of the links between rural communities and the forest ecosystem. I am especially interested how different people make use of different aspects of the forests, for instance how women use different aspects of the forests than men.

The aspects of the relationship between the village and the forest on which I am focusing in this research are: Grazing (who makes use of the forest for grazing cattle/who collects fodder and where?), the social relationships of sacred sites in the forest, how people make use of the nutrients which came down from the forest in the streams and how different fields are differently impacted by wild animals, resulting in crop damage.

To get a complete image of how different people in the community are differently making use of these ecosystem services (and are differently affected by dis-services) I would like to live in the village for some two months. Living in the village is essential for my research, as only through being with the people in the community all the time I can build an understanding of their relation with the forest. In the end I aim to be able to look at the forest through the eyes of the different people of the community: To learn the insider's perspective.

You can help me with my research by allowing me to come with you while you are doing your daily forest-related activities (e.g. grazing your cattle, visiting the sacred sites, protecting your fields against wild animals) and telling me how you perform them. Also, I would like to learn from you how to perform these activities myself in order to understand them better (doing things is better than only talking about them).

To help me and our mutual understanding, there will be a translator with me who speaks both Oriya and English, as I do not yet understand the Oriya language. If at any time you feel you cannot or do not want to answer a question or have me come with you, you should let me know. In this case I will not ask any further questions and just leave you alone, as you wish. It is against my will and the purpose of my research to make you feel uncomfortable, if any such feelings arise, let me know and I will pursue my inquiry any farther.

The information you provide as a community and as individuals will remain confidential. Any person's name given to me will not be revealed to anyone else. If there at any time is anything that you have told me which I should not use for my study (because it concerns a matter of secrecy), I will leave it "off the record", upon your request.

I will use the data to show that people's relation with the forest is complex and embedded in social interactions and relations. I am interested at how different user groups are related differently to the forest, and hence I will use the experiences of these groups in my writings and not the accounts of individuals. You as an individual will not be identifiable in this research and neither will your individual knowledge about the forest and its uses.

I would like to hold a closing meeting with all who participated in the research in order to get some feedback from you about the research and specifically about the things that I have learned by then in your community. Also, at the end of my research I will make sure there will be a summary of my research in Hindi and Oriya and that copies of these will be made available to the community.

### **Question and Answer and contact details**

I understand it if after reading this, some questions you have about my research remain unanswered. If this is the case, please feel free to ask me about them at any time, during the ongoing research, but also afterwards, should anything remain unclear. You can reach me on my mobile (7381434102) or you can contact Mr. Neelamani Mohapatra from Vasundhara's Ranpur Field Office (9437519940) who also knows about my research and who is my local facilitator. You are also welcome to contact me through email (roan.lakerveld@gmail.com) or contact my overall project supervisor Oliver Springate-Baginski, researcher at the University of East Anglia, UK (Oliver.Springate@uea.ac.uk) who can verify who I am and what kind of research I am doing in Ranpur.

### **Agreement to participate**

[Respondent's copy]

I have received the information about the research in written form and read it/had it read to me. Anything I did not understand was explained and all my questions were answered. I understand I can withdraw my participation at any time and can withdraw information I gave to the researcher if I feel this is needed.

I, ..... agree/disagree to participate in the study.

Signature/Mark of the Respondent

Date:

Signature of Researcher:

Date:



## **Agreement to participate**

[Researcher's copy]

I have received the information about the research in written form and read it/had it read to me. Anything I did not understand was explained and all my questions were answered. I understand I can withdraw my participation at any time and can withdraw information I gave to the researcher if I feel this is needed.

I, ..... agree/disagree to participate in the study.

Signature/Mark of the Respondent

Date:

Signature of Researcher:

Date:







[Redacted]

ତାରିଖ - 03/01/2012

Agreement to participate

ଗ୍ରାମୀଣ ମାନବ ସମ୍ପଦ ପ୍ରତି ଉତ୍ସାହ ପୂର୍ଣ୍ଣ ଉପାଦାନ ଓ ଉପାଦାନ ଗ୍ରହଣ  
କରିବା ପାଇଁ, ଗ୍ରାମୀଣଙ୍କୁ ଗାଈର ବ୍ୟବସାୟ  
କାର୍ଯ୍ୟ କ୍ଷେତ୍ରକୁ ପ୍ରତି ମାତ୍ର ଏହି ଗ୍ରାମୀଣ ମାନବ ସମ୍ପଦ ପ୍ରତି  
ଉପାଦାନ ଦେବୁ ।

Signatures of village representatives

- Jayadev Nayak - Jayadev Nayak
- Sarath Semantaraia - Sarath Semantaraia
- ~~Pradhar~~ Pradhar - Pradhar Baban

Signature of the researcher

Roar Baberwald - R Baberwald

ତାରିଖ - 03/01/2012