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Territorio, Ambiente, Risorse e Salute

CICLO XXVII

***MEASURING THE EFFECTIVENESS OF CONSERVATION GOVERNANCE,
POLICIES AND PROGRAMMES IN FOREST PROTECTED AREAS***

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Summary

Failures of governance underlay many problems in natural resource management. *In-situ* conservation strategies, such as forest protected areas (FPAs), are currently one of the main strategies for forest and terrestrial biodiversity conservation. Nevertheless, there is no clear evidence in the current literature on the exact role of governance arrangements and cause-effect relationships between decision-making style and conservation outcomes of forest protected areas. Governance theory deals with the inquiry of how decisions are made and how decisions are implemented given the existing institutional frame and interactions of different actors. This work aims to clarify the role of governance, its diversity, quality and change, in the functioning of forest protected areas to deliver the desired social and ecological outcomes. Accordingly, the dissertation has three specific objectives: 1) to characterise and collate an evidence base on the role of governance in forest protected areas and their conservation outcomes globally; 2) to analyse potential for a shift from hierarchical to collaborative governance in a case example of tiger conservation; and 3) to evaluate inclusive policies and their implementation through state-driven decentralization programmes on the ground. This work applies a combination of qualitative and quantitative methods, including systematic review methodology, qualitative data analysis and quantitative impact assessment. The first part of the dissertation (Chapter 2) collates the evidence on conservation success of FPAs conditional on the type of their governance. This chapter explores protected areas globally and synthesizes the published literature up-to-today to create a global map of the evidence and knowledge base on the role of governance in the conservation effectiveness of protected areas with respect to social and ecological outcomes. The current evidence base is small and fragmented with the low explanatory power and methodological weaknesses. Conservation research often does not account for local governance elements while making judgement on conservation success. In case where it does, it measures conservation success through mainly one type of conservation outcome (ecological). However, social-related issues such as actors' attitudes and behaviour (intermediate outcomes on the change pathway) might contribute to more complete picture of the protected area success. The second part of the dissertation (Chapters 3 and 4) uses tiger conservation in central India as a case example to analyse governance change and the gaps between socially-inclusive and collaborative policies and actual practices on the ground. Chapter 3 investigates, from an institutional perspective, enabling and disabling factors for a shift towards "landscape-level conservation" that implies collaboration between PA managers and different actors in central India. The results show how a mix of institutional and cognitive factors can constrain a shift to the collaboration. Organisational structure of the public management agency and its "fortress conservation" mentality is perceived to be a major constrain for a change. Chapter 4 examines the case of two participatory projects around Pench Tiger Reserve in Madhya Pradesh and evaluates the effects of project participation through local community's attitudes towards biodiversity and trust and satisfaction with reserve authorities. The existing participatory approach seems to have only a small effect, mainly to people's conservation knowledge but not to their biodiversity attitudes and institutional trust. The main findings of this dissertation calls attention to the understanding of the decision-making process, informal and formal institutions and interactions between conservation actors for more complete understanding and measurement of conservation success.

Riassunto

Fallimenti di politiche e di governance sottendono molti problemi nella gestione delle risorse naturali. Interventi di conservazione *in situ*, come la creazione e gestione di aree forestali protette (AFP), sono attualmente una delle principali strategie per la conservazione delle risorse forestali e della biodiversità terrestre. Tuttavia, in letteratura, non vi è alcuna chiara evidenza sul ruolo dei meccanismi di governance e sulle relazioni di causa-effetto tra processo decisionale ed esiti della conservazione di AFP. La teoria della governance si occupa di come vengono prese e attuate le decisioni in un determinato contesto istituzionale e in presenza di determinate interazioni tra i diversi attori. Questo lavoro si propone di chiarire il ruolo dei meccanismi di governance, della loro diversità, qualità e degli eventuali cambiamenti, sul funzionamento di aree forestali protette affinché queste ultime possano offrire i risultati sociali ed ecologici desiderati. A questo scopo, la tesi ha tre obiettivi specifici: 1) caratterizzare, raccogliere e sistematizzare le conoscenze esistenti a livello globale sul ruolo della governance in AFP e sui loro risultati in termini di conservazione; 2) analizzare le potenzialità di un cambiamento da un approccio gerarchico ad una governance collaborativa in un caso esemplificativo di area protetta finalizzata alla conservazione della tigre; e 3) valutare le politiche di inclusione e la loro attuazione attraverso i programmi di partecipazione pubblica e decentramento dello Stato, sulla base degli interventi operativi realizzati a scala locale. In questo lavoro si applica una combinazione di metodi qualitativi e quantitativi, tra cui una metodologia di revisione sistematica della letteratura, un'analisi qualitativa di dati raccolti tramite interviste semi-strutturate ed una valutazione di impatto basata su metodi quantitativi. La prima parte della tesi (Capitolo 2) raccoglie le evidenze dei casi di successo ed efficacia di interventi di conservazione di AFP in ragione del tipo di governance cui le aree protette stesse sono soggette. Questo capitolo esplora aree protette a livello globale e sintetizza la letteratura ad oggi pubblicata al fine di creare una mappa globale delle evidenze ed una base di conoscenze sul ruolo della governance nell'efficacia della conservazione di AFP in relazione ai risultati sociali ed ecologici attesi. Le evidenze attualmente disponibili sono limitate e frammentate, hanno un potere esplicativo contenuto e debolezze metodologiche. La ricerca in questo campo spesso non tiene conto degli elementi di governance locale nel formulare un giudizio sul successo delle strategie e degli interventi di conservazione. Nel caso in cui lo fa, spesso misura il successo della conservazione soltanto (o soprattutto) attraverso i risultati dal punto di vista ecologico. Tuttavia, risultati sociali quali nuovi atteggiamenti e comportamenti (outcome intermedi lungo un percorso di cambiamento indotto da interventi di conservazione) potrebbero contribuire a fornire un quadro più completo dell'efficacia e del successo dell'area protetta. La seconda parte della tesi (Capitoli 3 e 4) usa il caso della conservazione della tigre in India centrale come esempio per analizzare il cambiamento nei meccanismi di governance e il divario tra le politiche e pratiche reali sul campo dal punto di vista dell'inclusione sociale e della collaborazione. Il Capitolo 3 indaga, da un punto di vista istituzionale, i fattori favorevoli e quelli che invece potrebbero ostacolare uno spostamento delle politiche e degli interventi verso una conservazione "a livello di paesaggio" (a scala meso, e non di singola unità boschiva, per esempio), che implica una maggior collaborazione tra i gestori dell'area protetta e i diversi attori, con un focus sempre in India centrale. I risultati mostrano

come un mix di fattori istituzionali e cognitivi siano in grado di limitare il passaggio alla collaborazione e di conseguenza di limitare la possibilità di proteggere e conservare in maniera efficace zone più ampie ed integrate di territorio. La struttura organizzativa interna dell'ente pubblico che si occupa della gestione dell'area protetta e la sua mentalità da "fortezza della conservazione" è percepita dagli operatori locali come un vincolo importante per un cambiamento. Il Capitolo 4 esamina il caso di due progetti partecipativi attuati nelle aree limitrofe alla Pench Tiger Reserve, nello Stato del Madhya Pradesh in India, e valuta gli effetti dei progetti/programmi di partecipazione e gestione congiunta dell'area attraverso l'analisi delle attitudini/atteggiamenti della comunità locale nei confronti della biodiversità, nonché la fiducia ed il grado di soddisfazione rispetto alle autorità pubbliche che operano nella riserva. Gli approcci e gli strumenti finora attuati sembrano avere un effetto molto limitato, solo in relazione alla conoscenza dei concetti di conservazione della biodiversità da parte delle persone residenti nell'area. Non si sono riscontrati effetti sulle attitudini, o sugli atteggiamenti/comportamenti dei membri della comunità locale nei confronti della biodiversità né sul loro grado di fiducia verso le istituzioni pubbliche. I principali risultati di questa tesi richiamano l'attenzione sull'importanza della comprensione del processo decisionale, le istituzioni informali e formali ed una più profonda comprensione delle interazioni tra attori per essere in grado di misurare il successo/efficacia degli interventi di conservazione di aree forestali protette ai fini della protezione della biodiversità.

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ABBREVIATIONS AND ACRONYMS

- CCB** Community Conserved Areas
- ED** Eco-development – a form of integrated conservation and development project
- ICDP** Integrated Conservation and Development Project
- IED** India Ecodevelopment – a project operational in 7 protected areas in India from 1994-2004
- FD** Forest Department
- FRA** Forest Rights Act Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 (or simply Forest Rights Act)
- FPAs** Forest protected areas
- JFM** Joint Forest Management
- NTCA** National Tiger Conservation Authority
- TRs** Tiger Reserves
- TTF** Tiger Task Force
- PAs** Protected Areas
- PSM** Propensity Score Matching
- PTR** Pench Tiger Reserve, Madhya Pradesh, India
- SR** Systematic Review
- WPA** Wildlife Protection Act, 1972
- WOK** ISI Web Of Knowledge publication database
-
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CHAPTER 1

INTRODUCTION

Background and problem statement

In-situ conservation strategies, such as forest protected areas (FPAs), are currently one of the main strategies for forest and terrestrial biodiversity conservation. The global protected area network is growing at an ever-increasing rate, covering 12% of Earth surface at present and protecting 13.5% of world's forests (Schmitt et al. 2009). However, biodiversity still continues to decline globally (Butchart et al. 2010).

The level of effectiveness of protected areas in producing desired ecological and social outcomes is unclear, including ambiguous evidence on a win-win solutions. A recent systematic review on the ecological impacts of terrestrial protected areas concluded that protected areas are proven to be effective in conserving habitat cover, but it is not entirely clear if they can successfully maintain species populations (Geldmann et al. 2013). Evidence on social impacts of protected areas is more ambiguous, and associated impacts are highly context-dependent with both negative and positive impact pathways (Pullin et al. 2013). Moreover, projects that combine development (e.g. poverty alleviation) and conservation (e.g. biodiversity conservation) goals are argued to be rarely successful, but the current evidence base is still not strong enough to provide any conclusive proofs (Adams et al. 2004; Brooks et al. 2006). Overall, there is a weak understanding of the factors under which protected areas provide desirable conservation or development outcomes.

Governance and institutional arrangements play an important role in determining efficacy of conservation policies and practice (Barrett et al. 2005). Some authors argue that governance influence: 1) management effectiveness through level of achievement of protected area objectives; 2) management equity through decisions on cost and benefit allocation; and 3) protected area viability through the establishment of

community, political and financial support (Eagles 2008; Borrini-Feyerabend et al. 2013). The important governance-relevant questions such as: *Who is accountable to whom? Who has decision powers? How decisions are made and implemented?* are frequently disregarded while examining PA effectiveness. Therefore, the cause-effect relationship between governance arrangements, PA (management) effectiveness and social and ecological outcomes is largely unclear (Pullin et al. 2013). There is a need for synthesis of existing evidence and provision of empirical answers on how different local governance arrangements and specific characteristics of decision-making and implementation process may influence conservation outcomes.

Conservation enforcement and implementation are frequently a difficult task, especially in developing tropical countries (Barrett et al. 2005). Effectiveness of implementation and enforcement frequently depends on the behaviour, values and motives of an implementing agency (Fleischman 2012).

With the recent paradigm shifts from strict and exclusive enforcement to participatory and collaborative policy implementation, the role of public agencies that manage parks is evolving. They are expected to abandon their traditions and exclusionary “mentality”, to adapt their working culture to people-oriented approaches, while increasing flexibility and improving communication skills, building trust with local community and other actors in the participatory and collaborative networks (Wyborn & Bixler 2013). Nevertheless, in the collaborative and participatory conservation literature, research on the behaviour of local conservation authorities, their possible resistance to change and influence on conservation policy implementation is limited (Lawrence 2007).

On the other side of the implementation effectiveness, it is argued that compliance with PA rules and support for conservation might be challenging if there is a lack of meaningful and active participation of local communities in decision-making positions (Andrade & Rhodes 2012). However, the final effects of participatory policies are often unclear and ambiguous. This is because existing evidence is frequently based on case studies and it is hard to create clear causal links between participation and resultant change in peoples’ conservation attitudes, behaviour and compliance. Therefore, there is a need for more rigorous evaluation studies with more robust designs to remove various

rival explanations of participatory effect, adjust for selection bias that occurs due to non-random assignment of such interventions (Miteva et al. 2012; Ferraro & Hanauer 2014; Baylis et al. 2015)

The following sections give an overview of the research objectives and research questions to fill the above identified knowledge gaps. Moreover, theoretical concepts that guide this research and a general overview of the whole work and forthcoming chapters are presented.

Objectives and research questions

Governance theory deals with the inquiry of how decisions are made and how decisions are implemented given the existing institutional frame and interactions of different actors (Kjaer 2004; Secco et al. 2014). This work aims to clarify the role of governance, its diversity, quality and change, in the functioning of forest protected areas to deliver the desired social and ecological outcomes.

Connected to different levels of enquiry, this dissertation has three main objectives: 1) to characterise and collate evidence base on the role of governance in forest protected areas and their conservation outcomes globally (**Chapter 2**); 2) to analyse the potential for a shift from hierarchical to collaborative governance in the case example of tiger conservation on the landscape level (**Chapter 3**); and 3) to evaluate inclusive policies and their implementation through state-driven decentralization programmes on the local level (**Chapter 4**).

Accordingly, this dissertation has three specific research questions:

1. What evidence exists on the role of governance in the effectiveness of forest protected areas?
 - Is there sufficient evidence on the comparative effectiveness of participatory versus top-down approaches in delivering conservation outcomes?
2. What are possible constraining and enabling factors for governance change in the continuum from “government to governance”, from park-centric to landscape level conservation?

- Can park authority change to follow the participatory politics and calls for collaboration?
3. How are shifts towards inclusive and collaborative policies reflected on the ground, at the level of project implementation?
- Is participation effective in a state-driven decentralization context?

The research connected to research questions 2 and 3 is conducted on the case of tiger conservation, placed in central Indian tiger landscape complex, in Central Indian highlands (chapter 3) and in Pench Tiger reserve, Madhya Pradesh (Chapter 4). The reasons and justification for the specific research locations are given in respective chapters.

Theoretical framework

This dissertation is based on the perspectives from social research *for* and *on* conservation (Sandbrook et al. 2013). It pragmatically tries to connect and integrate different data, various methods and theories from disparate disciplines to understand how different actors and institutions interact and influence conservation outcomes in more or less effective way.

I consider FPAs as part of coupled systems of humans and the environment i.e. social-ecological systems (SES). FPAs exist through both ecological and social matrices; they are well connected to and functionally dependent on the political, social and economic structures in society. Governance modes of FPAs are equally complex and they exist on multiple interconnected (often uncoordinated) levels and scales: from local to international. Governance is context dependent and embedded in the cultural, political and social systems. To understand the links and feedback between governance modes and the success of FPAs it is necessary to use pluralistic approaches to obtain knowledge and best understanding of these complex systems, focus at different spatial and temporal scales, understand wider policy context and their history (Ostrom & Nagendra 2006).

This research starts from governance theories and link them to practice of conservation through critical examination of different aspects of conservation policy, its implementation and effectiveness. This is to ultimately emphasise the role of frequently forgotten local socio-political processes in the conservation success (Brechtin et al. 2002). In order to achieve research objectives, this dissertation draws on findings and literature from political science, conservation biology, social psychology, development studies, and systems thinking. The application of these theories is evident within each of the data chapters.

Here, an overview of the governance theories is given with explanation of the shifts in conservation policy and practice thinking, and a critique to participation in order to introduce the rest of the dissertation.

GOVERNANCE THEORIES

“[...]meanings and interpretations of governance—which determine its actual elaboration and deployment—are framed by the historically contingent and constitutive interdependence between knowledge, representation and relations of power” (Batterbury & Fernando 2006).

“*Governance*” is a highly contested concept used in various scientific fields and political processes, and it has many definitions and meanings. The definition depends on the particular research field and context, level at which policy and decision-making is analysed, views of relationships between governance actors, role of the state, researcher understanding of the institutional change, etc. Here, are explained in brief different interpretations of governance, starting from the institutional grounding of the concept.

Theories of governance have grounding in the institutionalism (Kjaer 2004). Institutions¹ are basic components of natural resource governance and are structures that shape and influence human behaviours, interests and values (Vatn 2005). Institutions can influence human behaviour through formal bureaucratic rules (e.g. official laws and contracts) or through more tacit, informal, socially embedded and unwritten rules (e.g. social norms). Institutions can be understood from two different perspectives. Individualist view defines institutions as external constraints that influence an individual “*in her calculation of what is the most optimal to do*” (Vatn, 2006: 2). They are informal and formal “rules of the game” that are concisely designed to decrease uncertainty (North 1990; Ostrom 1990). Social constructivists argue how institutions are not only external constraints, but are rules that can form individuals and their values (Vatn 2006). Institutions can be also explained through the “bricolage” concept that emphasises the role of power (asymmetries), social relationships and historical legacy in the institutional crafting and rule enforcement, which is missing in previous accounts of institutions (Cleaver 2001, 2002). New institutions are created refurbishing the old ones, patched together from different social, cultural and political sources, through constant adaptation, innovation and legitimisation (Koning and Cleaver, 2012).

Governance research introduces missing human agency in the structure and analysis of institutions. From the institutional perspective, a broad definition of governance refers to the rules’ setting, application and enforcement (Kjaer 2004).

Applicable for more local and protected area levels, governance can be defined as a “*set of processes, procedures, resources, institutions and actors that determine how decisions are made and implemented*” (Secco et al., 2010: 105). It is essentially about “*who has the influence, who decides and how decision makers are held accountable*” (Graham et al. 2003; Borrini-Feyerabend et al. 2006:116). The research presented in the dissertation uses this overarching governance definition.

However, distinction between terms “*management*” and “*governance*” are often blurred in the conservation literature. Governance of natural resources and protected areas investigates policy, decision-making and implementation processes and corresponds to

¹ Institutions can also be understood as organisations. Organisations are “set of institutional arrangements and participants who have a common set of goals and purposes, and who must interact across multiple action situations at different levels of activity” (Polski & Ostrom 1999:4). They are agencies, multi-lateral

actors and their networks that facilitate formulation and implementation of a policy (Pahl-Wostl, 2009). Management is about “*resources, plans and actions that are a product of applied governance*” (Lockwood 2010:755). Management is composed of activities “*of analysing and monitoring, developing and implementing measures to keep the state of a resource within desirable bounds*” (Pahl-Wostl 2009:355).

Governance scholars often focus on the role of the state in the regulation, policy making and implementation. In this stream of thinking, governance literature explores transformed roles of the state in today’s society and analyses shifts “*from government to governance*” (Bodegom et al. 2008).

The terms government and governance should not be confused although they have the same roots and they were traditionally understood as synonyms (Jabeen 2007). The notion of government refers to an “old” governance model (Peters 2000). It is a top-down, monocentric, hierarchical and formal way of governing where the state steers, exerts control over society, economy and resources (Termeer et al. 2010). This is the traditional state-centric system of command-and-control. Therefore, the issue at focus in the literature on “old” governance is the level and capacity of a state to control (Pierre 2000). However, it is argued that ‘old’ forms of hierarchical governance frequently fail to give proper answers to current multi-scale complex environmental issues (Bulkeley 2005; Lemos & Agrawal 2006), especially with the current processes of neoliberalization, decentralisation and individualisation (Van Tatenhove et al. 2000).

Governance, as a “new” form of decision-making (Peters 2000) refers to co-ordination and implies involvement of not only a state, but also of a private sector and civil society in the decision-making process (Borrini-Feyerabend et al. 2006). The new governance model mainly rests upon less formal governing and soft laws i.e. non-binding documents and voluntary instruments such as standards (Mörth 2005).

This division to “old” and “new” governance can help in focusing on novel forms of power distribution and solving collective problems. Nevertheless, in contemporary decision-making these borders are blurred, as there is continuum rather than a complete shift of control from government (state power) to governance (non-state actors (Hezri & Dovers 2006). Rhodes further writes: “*the most fascinating puzzles may be*

found at the boundaries of governing modes, both old and new, where they overlap, merge into one another and develop hybrid forms” (Rhodes 2005:4).

Moreover, the state is still present and needed, not only to monitor activities of new governance instruments (Lemos & Agrawal 2006), but also to “*back up the authority and legitimacy of new governance solutions*” (Paavola et al. 2009:3)

Governance is seen as a tool for solving environmental dilemmas and conflicts (of interest) over environmental resources (Davidson & Frickel 2004; Paavola 2007). This definition is argued to eliminate distinction between government and governance, as it rather emphasises the importance of social justice (over pure economical efficiency) in governance studies (Paavola 2007).

Some authors, within the “new” governance thinking, focus on governance as networks. According to Kjaer (2004), the network governance refers to interaction of a centre with the society, implying the notion of the connectivity and both horizontal and vertical relations within the society (Kjaer 2004). Rhodes sees governance as “*self-organising, interorganisational networks*” (Rhodes 1996:660). Similarly Jessop defines governance as heterarchy that implies “*self-organising interpersonal networks, negotiated inter-organisational co-ordination and decentred, context mediated inter-systematic steering*” (Jessop 1998:29)

Apart from hierarchies and networks, governance as a model of governing can also be developed and enforced by markets. Due to dissatisfaction with the regulatory control by the state, voluntary, incentive-based mechanisms and free-market solutions such as: eco-tax, certification, eco-labelling, voluntary conservation agreements are becoming well established in the environmental governance (Lemos & Agrawal 2006).

Other authors point to broader issues of governing and focus on the importance of scale and interactions between different governance levels. Governance operates at various scales and levels. According to Gibson et al. (2000), *scales* are defined as “*the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon*”, while *levels* are “*the units of analysis that are located at the same position on a scale*”, but not necessarily hierarchically ordered.

Governance is characterised as multi-level (Hooghe & Marks 2003) and functioning on “*local, national, international and intermediate levels simultaneously*” (Paavola 2007:94), emphasising upward, downward and sideways reallocation of authority from central states (Hooghe & Marks 2003). This conceptualisation of governance emphasises importance of jurisdictional or spatial scale, their levels and cross-level interactions in governance research (Termeer et al. 2010). The notion of multi-level governance has emerged from EU-studies (Kjaer 2004)

The notion of polycentric governance refers to organisation of authorities and tackles inter-sectoral problems. This approach implies existence of numerous decision-making centres being formally independent of each other (Ostrom et al. 1961, 2010). *Where facts are uncertain, values in dispute, stakes high and decisions urgent* (Funtowicz & Ravetz 1991), multi-layered polycentric governance efficiently linked across scales, is perceived to provide a variety of responses to the complex problems, encouraging necessary innovation and self-organisation (Ostrom 1998)

Adaptive governance is about change, complexity and uncertainty in socio-ecological systems (Folke et al. 2005). Governance is closely related to ability of society to manage system resilience (Lebel et al. 2006) that is a measure of amount of change a system can undergo and still retain the same controls on structure or function (Folke et al. 2002; Lebel et al. 2006). Multi-scale interactions, institutional “interplay” between scales, and “fit” between social and ecological systems are focal points of this approach (Young 2002; Termeer et al. 2010). These authors argue that the most common problem in the governance of the natural resources is the fit problem (Young et al. 2006; Bruyninckx 2009; Paavola et al. 2009). Namely, frequently there is a mismatch between scales of decision-making and policy intervention (social scale) and the resources we want to govern (ecological scale).

Despite diversity of definitions and uses of the term, Kjaer (2004) points out that essentially focus of governance is on efficiency and democracy. These two pivots are further connected to “output” and “input” legitimacy respectively.

Legitimacy is about recognition of different actors and their values, fair participation and legitimate distribution in order to produce compliance with the established rules (Paavola 2007). Output-oriented legitimacy originates in “*effectiveness of rules to produce tangible results*”. Input-oriented legitimacy deals with democratic governance processes and comes from “*agreement of those who are asked to comply with the rules*” (Kjaer 2004:12).

CONSERVATION AND GOVERNANCE EVALUATION

According to the *Oxford dictionary of English*, effectiveness is the degree to which something is successful in producing a desired result, whereas success is the accomplishment of an aim or purpose, i.e. it is the effectiveness of the treatment.

One of the most important steps in policy cycle is thorough policy analysis and robust evaluation, which drive further policy advancement. Evaluation of governance is also a precondition for its improvement. Yet, there is still no consolidated way of measuring governance effectiveness in forestry and biodiversity conservation (Giessen & Buttoud 2014). Moreover, there are very few attempts to evaluate forest and conservation governance at the local (intervention) level where the concrete decisions are taken (Borrini-Feyerabend et al. 2013; Secco et al. 2014)

There are, however, two general approaches in governance evaluation: process-oriented and outcome-oriented (Wesselink & Paavola 2008; Rauschmayer et al. 2009). Process-oriented evaluation looks at how process or procedures are conducted during formulation and/or implementation of the governance arrangements and assumes that the governance outcomes will be effective if the implementation procedure is good (Secco et al. 2014). This approach refers to measurements of governance quality under the “good governance” concept that is a set of normative principles such as legitimacy, accountability, participation, transparency, etc. (Giessen & Buttoud 2014).

Outcome - oriented approach implies that “*an outcome of a governance process can be analysed with regard to its direct outputs and to the assumed consequences of such outputs, in terms of changes in the system-to-be-governed*” (Wesselink & Paavola 2008:18). However, one of the major disadvantages of this approach is that frequently one cannot see the clear direct link i.e. establish causality between adopted governance

measures and the changes in the system. Uncertainty and methodological weaknesses connected to both process and outcome evaluation could be solved with their integration (Rauschmayer et al. 2009)

Then again, there are more developments in the field of policy and programme impact evaluation and conservation scientists are trying to mainstream these developments into evaluation of conservation policies and practices (Baylis et al. 2015). An evaluator needs to create a proper counterfactual (*What would have happened if there had been no intervention at all?*) and eliminate rival explanations to measure observed impacts² (Ferraro 2009:77). Appropriate study designs that can attribute impact to the intervention, having baseline data (condition before intervention), and control for confounding variables are the basics of reliable and robust measurement of impacts (Ferraro & Pattanayak 2006). Confounding can arise from: 1) contemporaneous factors occurring along with the project and affecting its outcomes (historical trends, unobserved ecological or socio-economical characteristics, etc.); 2) selection bias as conservation interventions are not randomly distributed in the landscape (Ferraro & Pattanayak 2006; Ferraro 2009). I will further explain types of study designs, counterfactual outcomes and reasons for problem of attribution in evaluation.

Impact measurement is operationalized through experimental or quasi-experimental designs that try to identify exogenous³ variation of an intervention (Ferraro, 2009). However, experimental design requires that there is a random assignment of intervention across study area, which is rare and unethical (in some cases) in the conservation context (Ferraro and Pattanayak, 2006). Quasi-experimental design tries to overcome randomization issue. A counterfactual is generated through: 1) chance/natural circumstances create a control group (natural experiment); 2) statistical matching where a control group is created by matching area or a subject under an intervention to a very similar non-intervention area or a subject; 3) creating instrumental variables as a source of exogenous variation (Ferraro & Hanauer 2014).

² In this dissertation, *impacts* are considered to be longer-term effects of an intervention, while *outcomes* are shorter-term or intermediately effects (see also Figure 4.1 for illustration of this)

³ *Exogenous* variable is “a variable in a model or system that is causally independent of other variables in the model or system.” *Endogenous* variable is “a variable in a model or system that is causally dependent on other variables in the model or system” (Ferraro & Pattanayak 2006: 483, box 2).

Moreover, non-experimental designs are applicable when control group or comparison is not available. This design does not have the same scientific rigour as experimental and quasi-experimental designs due to smaller power to detect causal relationships. However, non-experimental designs can have higher external validity than for example experimental designs, as stronger generalisability is implied by a natural setting (Margoluis et al. 2009:88)

Quantitative research designs (experimental, quasi-experimental and non-experimental) are subject to time and funding and, hence, often difficult to implement in the real-life conservation. In such circumstances, qualitative evaluation allows for in-depth analysis of intervention pathways. It does not use a counterfactual, but it can be applied also along quasi- and non-experimental designs to better understand their findings. Here, the main element of the robust evaluation design is a sampling strategy (Margoluis et al., 2009).

A key issue that needs to be considered in the evaluation is a question of validity. External validity considers wider applicability or generalizability of the evaluation to other people, locations and times. Internal validity is about estimating casual relationship (controlling for hidden bias). Construct validity is independent of the study design and is about whether the reported treatments and outcomes are the ones actually measured (Margoluis et al. 2009)

Finally, non-linear response outcomes, lack of appropriate comparator, multiple interventions of a single conservation program, time lag between intervention and a response, spill-over effects, etc. question applicability of impact evaluation due to attribution problem. Modifying effects of governance and local-political process in PAs are adding to the complexity of evaluation. Therefore, linking conservation interventions (e.g. protected areas) with resulting biophysical changes in the environment (e.g. forest cover) becomes extremely difficult. This could be surpassed by measuring impact on the intermediate scale such as changes or differences⁴ in human behaviour (Ferraro, 2009) or even changes in people's attitudes that lead to that behaviour. A theory of change helps evaluator to hypothesize the pathway from an

⁴ Difference in wording comes from a type of comparator. Before/after comparison can show outcome *changes*, while control/impact comparison can show outcome *differences*

intervention to different or intermediary outcomes and impacts and to develop alternative explanations for observed effects (see **Chapter 4, Figure 4.1**).

Finally, scale misconceptions might affect effectiveness and efficiency of policy intervention. The scale in the field of policy evaluation “*has an impact on defining issues, collecting data at the appropriate level, identifying resources and stakeholders that function at this particular scale, and formulating policy*” (Bruyninckx, 2009:32).

SHIFTING DISCOURSES AND GOVERNANCE MODES IN CONSERVATION

Conservation is inherently political process (Leader-Williams et al. 2010) practiced in “a world laden with power differentials between governments, between institutions, and between people” (Lewis 2005:186).

Protected areas are spaces set aside to restrict access to the resources. The governing rules, restrictions and the access rights can be agreed upon and executed by the national government, local communities, privates or combination of these actors. Moreover, distribution of power, decision-making scale, types of actors and nature of their collaboration classifies governance into 4 modes: 1) governance by government, 2) shared governance or co-management, 3) private governance and 4) governance by communities and indigenous people. (Borrini-Feyerabend 2003; Borrini-Feyerabend et al. 2006) (see also **Chapter 2.1**). These different approaches to conservation are frequently determined by global political economy and are exercised through international conservation agreements (Macura et al. 2013).

Command-and-control⁵ government-led approach has been dominant in conservation practice and introduced to developing countries, making nature-culture divide and often dissolving pre-existing traditional community resource governance (Philip 2004). This is “old governance” with monocentric hierarchical structure, valuing expert over local knowledge and excluding local people both from the meaningful decision-making and from the physical park territory (by forcefully evictions and involuntary relocations).

⁵ Also called in the literature as “fence and fine approach”, “fortress conservation” or “conservation by exclusion”

Despite a view that government-run protected areas with defined and restricted resource uses is the successful strategy to keep the forests intact, other scholars argue that these exclusive approaches create high social costs locally through increasing conflicts among protected areas and local people (Wilshusen et al. 2002). This unequal distribution of benefits can ultimately lead to negative attitudes among local people (for a review see: Macura et al. 2011), lack of compliance and anti-conservation behaviour (retaliation), which can negatively reflect on biodiversity level (White et al. 2009)

Pushed by international conservation agreements and donor funding (such as World Bank), since 1980's and early 1990's these protected areas frequently have some level of people involvement through integrated conservation and development projects (ICDPs). However, the idea behind the ICDP is purely conservation-centric – it is usually based on the provision of alternative livelihood sources to adjacent local communities in order to wean them away from parks (Brown 2002)

After early 1980's "new" and more inclusive governance of the protected areas emerged. This "populist" discourse and inclusive paradigm recognised local people as valid and legitimate actors in conservation (Reyes-Garcia et al. 2013).

Power sharing, decentralization or devolution and multi-level interactions among actors frame this "new" paradigm. Co-managed or multi-stakeholder protected areas are arrangements between a governmental agency and local/mobile/indigenous communities, user associations, private entrepreneurs and landowners that together share power and responsibility, make and enforce decisions. Community conserved areas rely on the self-enforcement, and are governed and voluntarily conserved by indigenous groups, local and mobile communities through customary laws and other traditional institutions. More recently and following global governance trends, private protected areas came into fore where private landowners, individuals, NGOs and other not-for profit and for-profit organisations make and enforce decisions, have control and/or ownership over resources (Borrini-Feyerabend et al. 2006).

Since recently there are calls for "back to barriers" movement arguing against inclusive protected areas based on their presumably unsuccessful record in conserving the

biodiversity and shifting attention from conservation to development goals (Hutton et al. 2005)

Protected areas continue to extend. Landscape-level and trans-boundary governance approaches emerged recently and it is especially applicable to the conservation of wide-ranging large carnivores (such as tigers). These complex governance arrangements extend the governance scales from local to regional and above to solve the problem of “fit” or align ecological with the governance scale. They require more intensive collaboration across scales, sectors and levels, coordination between landscape actors so their actions have meaningful direction, nested governance that can accommodate different decision levels and arena for consensus building, negotiation over land tenure (for illustration see: Wyborn & Bixler 2013)

Participation in protected area governance may have several different roles (Lawrence 2007; Niedzialkowski et al. 2012): a) shift responsibility from governments to local level actors and help (donor- or state-propelled) decentralization, b) increase legitimacy of conservation by inclusion (process legitimacy) and solve local conflict, c) create better conservation outcomes (output legitimacy) through increasing awareness of locals about resources or simply regenerate resources at lower cost.

Depending on different institutional designs, social (sometimes exclusive) norms that moderate interactions among participants and the final aim of participation, there are several modes of participating: passive, nominal, consultative, activity-specific, active and finally interactive (empowering) participation.

However, participation is frequently criticised on various grounds. It means so many things to so many people as the term may refer to: share of intention, an action or an impact (Lawrence 2007). In their book, Cooke and Kothari (2001), argue that participation usually serves the interests of donors, but also it can be manipulated by the local people. Participation focus on achieving efficiency does not actually lead to empowerment of local people (which is often a moral stand in the reasons to use participation)(Reed 2008).

When being implemented (or imposed by donor requirements) where it does not fit the local culture and social structures, it creates participatory “exclusions” instead (Agarwal

2001) or it can even erode positive conservation and institutional attitudes (Macura et al. 2011). Even where culturally accepted, when requiring participation as a tool (regardless of purpose) it is frequently (but wrongly) assumed that local communities are homogenous group of people with the same motives (Agrawal & Gibson 1999). In such circumstances, participation can often create deeper structural gaps in the local community. Moreover, participation arenas can also serve as re-assertion of the control and power by dominant actors (elite capture- (e.g. Balooni et al. 2010)) or for shifting responsibility from practitioners to locals, making local community convenient scapegoat for failures of conservation and undesired ecological outcomes (Cooke & Kothari 2001)

Finally, earlier mentioned conservation evaluation implies measurement of success. However, the question is what success means to different actors in the conservation. Having in mind presented complexity of the protected areas, success is not easy to define. Protected areas are increasingly established not only to conserve biodiversity, but also to provide ecosystem benefits and socio-economical support to adjacent communities, have tourism purpose (Watson et al. 2014). Therefore, it is frequently not possible to evaluate conservation success only based on the ecological outcomes such as species abundance or forest cover. This cannot inform about local conflicts or retaliatory behaviour (White et al. 2009). Focusing on ecological measures of success might disregard objectives of local power actors, which may produce negative conservation outcomes in the future (Murray 2005). It is argued that calls for fortress conservation become more frequent out of the reductionist view of conservation success (Brechtin et al. 2010)

Dissertation structure

This dissertation is composed of five chapters, with three standalone data chapters, all revolving around different facets of governance in FPAs. The work presented here uses a combination of qualitative and quantitative approaches including systematic review methodology, qualitative data analysis and quantitative impact assessment that are all separately described in the data chapters.

First part of the dissertation (**Chapter 2**) collates the evidence on conservation success of FPAs conditional on the type of their governance. This chapter explores protected areas globally and synthesizes the published literature up-to-day to create a global map of the evidence and knowledge base on the role of governance in the conservation effectiveness of protected area with respect to social and ecological outcomes. The results of the map call attention to the knowledge-gaps in the field of conservation governance, provide inputs for future research and generate questions for potential evidence syntheses.

Second part of the dissertation (**Chapters 3 and 4**) uses tiger conservation in central India as a case example to analyse governance change and the gaps between socially-inclusive and collaborative policies and actual practices on the ground. **Chapter 3** investigates, from institutional perspective, enabling and disabling factors for a shift towards “landscape-level conservation” that implies sectoral integration, inclusion and collaboration between PA managers and different actors in central Indian tiger landscape. **Chapter 4** focuses on the local level participatory policy implementation. It examines the case of two participatory projects around Pench Tiger Reserve in Madhya Pradesh and evaluates the effects of project participation through local community’s attitudes towards biodiversity and trust and satisfaction with reserve authorities. Chapter 5 contains discussion, policy and practice recommendations and conclusions. **Table 1.1.** provides a brief overview of research questions, methodology and research outputs.

TABLE 1.1 SUMMARY OF RESERACH QUESTIONS, METHODS AND OUTPUTS

Research questions	1. What evidence exists on the role of governance in the effectiveness of forest protected areas?	2. What are possible constraining and enabling factors for governance change in the continuum from “government to governance”, from park-centric to landscape level conservation?	3. How are shifts towards inclusive and collaborative policies reflected on the ground, at the level of project implementation?
Research level and focus of the study	<u>Global</u> : Collating and characterising evidence on governance in FPAs globally	<u>Regional</u> : Institutional analysis of enabling and constraining factors for management change	<u>Local</u> : Effectiveness of participatory projects in state-driven decentralization context
Method	Systematic evidence synthesis	Case study: Qualitative data analysis (Grounded theory approach)	Case study: Matching and quantitative impact assessment
Evidence source	Secondary: existing qualitative and quantitative literature on FPAs	Empirical: Fieldwork data from Pune, Nagpur, Dehradun and New Delhi	Empirical: Fieldwork data from Pench Tiger reserve, Madhya Pradesh
Data collection	Search through 15 publication databases, 47 organisational websites, bibliographic and internet search	Open-ended interviews, direct observation, analysis of policy documents	321 household surveys, 3 months of direct observation, 30 semi/structured informal and formal interviews
Research Outputs	Chapter 2:Protocol published in Environmental Evidence; Systematic map submitted to Environmental Evidence	Chapter 3 under preparation for publication	Chapter 4:Under review in Regional Environmental Change

Figure 1.1 provides a quick overview of the connections between the chapters, and nested structure of the thesis with the research conducted at different levels (noted on the left side arrow) and through different methodological approaches (right side arrow).

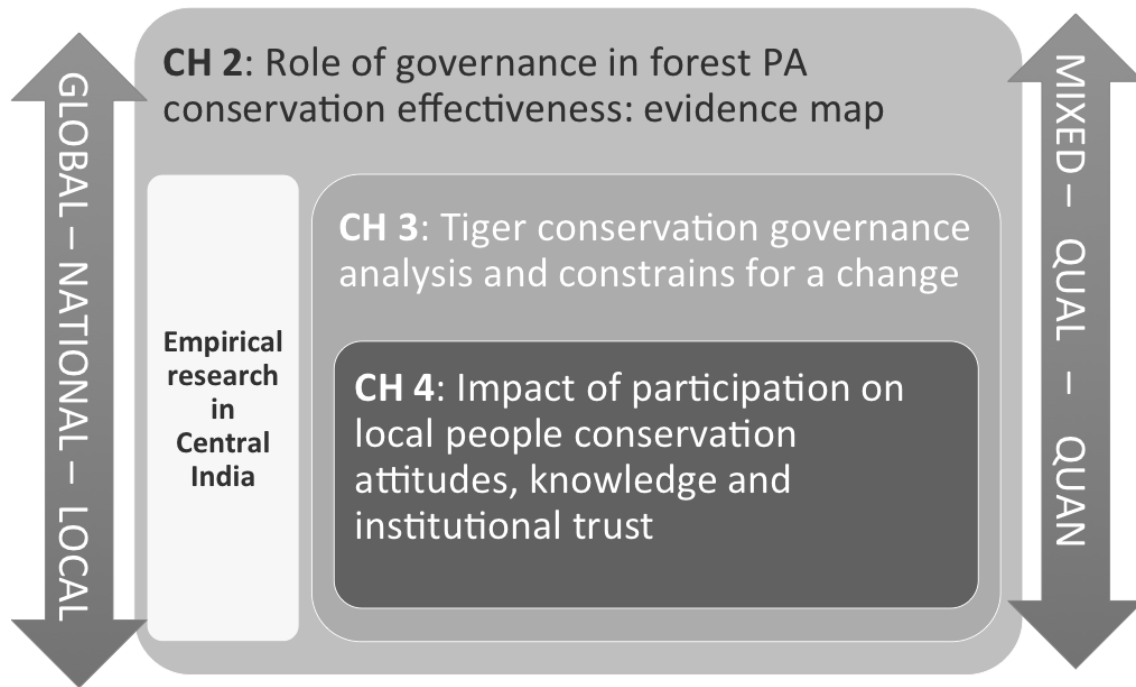


FIGURE 1.1 CONNECTION BETWEEN THE CHAPTERS AND RESEARCH LOGIC

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CHAPTER 2

THE ROLE OF GOVERNANCE IN FOREST PROTECTED AREAS: MAPPING THE EVIDENCE

Primary research, which presents answers to policy-relevant questions, is rapidly growing in the field of conservation (Woodcock et al. 2014). A reviewing and synthesising research finding is thus increasingly important to help inform policy and support decision-making. However, factors that introduce bias in evidence synthesis, such as variability of primary research quality or the subjectivity of a reviewer, may feed unreliable findings to policy and practice.

Traditional reviews are often hampered by the lack of comprehensiveness, transparency and reliability. They are also highly susceptible to bias. Sources of bias are emerging from all stages of the review process: evidence identification (e.g. using only one search database or not including grey literature), evidence selection (e.g. selecting studies by the authors familiar to a reviewer) and synthesis (e.g. vote counting) (Woodcock et al. 2014; Haddaway et al. 2015).

Systematic evidence synthesis (including systematic maps and systematic reviews) is considered to be a gold standard for reliable evidence compilation and/or syntheses. This is a rigorous tool for collating and synthesising a large amount of available evidence in a transparent, repeatable and objective way (Pullin & Knight 2009). The reliability and rigour of this review methodology is founded in transparent and strict review procedures that aim to mitigate bias, increase procedural objectivity and critically appraise the evidence (Petticrew & Roberts 2006; Haddaway et al. 2015).

Systematic evidence synthesis is used across several fields (e.g. education research, medicine and policy evaluation). They include peer-reviewed and grey literature, and may mix both qualitative and quantitative evidence. Inspired by health research, this methodology has been adopted since 2006 in the field of environmental management and conservation (Pullin & Knight 2001). It's suitability was evident by its ability to

help build an evidence base to answer effectiveness-related questions (i.e. what works and under what conditions) in the field of conservation (Pullin & Knight 2009). Systematic evidence syntheses have been increasingly commissioned by decision-making organisations and are used to inform policy-makers (Pullin & Knight 2012).

In comparison to full systematic reviews used for evidence synthesis, systematic maps are tools for cataloguing existing evidence. They aim to collate evidence on a broad policy- or practice-relevant question and identify knowledge gaps (Gough et al. 2012). Thus, the mapping process does not involve a full critical appraisal (i.e. studies are not appraised for external validity), evidence extraction or synthesis (CEE, 2013).

The systematic mapping process is composed of several successive phases: 1) identifying & developing the research question (with involvement of stakeholders); 2) generating and publishing a peer-reviewed protocol (see Chapter 2.1 and Macura et al. 2013); 3) undertaking a systematic search for studies; 4) selecting relevant evidence; 5) assessing quality of the mapped studies through appraisal of the internal validity; 6) reporting & dissemination of findings (Chapter 2.2).

This chapter is composed of two parts. The first section (Chapter 2.1) contains the protocol for the evidence synthesis. The protocol has been peer-reviewed and published in the *Journal of Environmental Evidence* (Macura et al. 2013). The protocol prescribed strict systematic procedures and detailed methodological steps to be used in the mixed-methods evidence map to follow (Chapter 2.2).

The methodology followed in this chapter is based on the Collaboration For Environmental Evidence (CEE) guidelines (2013) for evidence synthesis.

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CHAPTER 2.1

SYSTEMATIC REVIEW PROTOCOL

Background

Forests contain roughly 90% of terrestrial biodiversity and they provide a wide variety of ecosystem services, contributing to the livelihoods of more than 1 billion people (World Bank 2008). Yet, forest degradation and deforestation are advancing at alarming rate, especially in the tropics (FAO 2010) and are putting at risk a high diversity of species and habitats sustained by forest ecosystems (Schmitt et al. 2009).

Establishment of *in situ* conservation strategies, such as protected areas (PAs), has been the major response to a global demand for conservation of biodiversity and ecosystem services (Millennium Ecosystem Assessment 2005) and more specifically, to the reduction of tropical deforestation (Andam et al. 2008). Accordingly, there has been a year-on-year increase in the number of PAs and they are today covering 12% of the total world's land surface (Dudley 2008) and 13.5% of the world's forests (Schmitt et al. 2009)

Nevertheless, the effectiveness of biodiversity and forest conservation measures⁶ is under question as the rate of biodiversity loss is not decelerating (Butchart et al. 2010). There is evidence that PAs are decreasing the deforestation rate (Naughton-Treves et al. 2005; Andam et al. 2008) estimated through measures of land clearing prevention (Bruner et al. 2001) and decreasing the incidence of forest fires (Nelson & Chomitz 2009). However, some authors argue that many of the claimed positive conservation effects might be a function of a PA location i.e. low accessibility of protected land, but not the effect of actual protection measures (Ferraro & Pattanayak 2006; Andam et al.

⁶ Under effective conservation we mean positive and measurable effects of conservation policies and practices on biodiversity and target ecosystems, populations, species or habitats.

2008). Additionally, increasing deforestation and pressures on the resources in social-ecological systems that surround PAs, might diminish conservation efforts inside PAs, through effects of ecological isolation and landscape fragmentation (Sánchez-Azofeifa et al. 2003; Naughton-Treves et al. 2005)

However, there is no systematic information on how different local governance modes and day-to-day decision-making processes within forest PAs may cause a change in PA effectiveness in terms of producing desired conservation outcomes. In context of PAs, governance can be defined as “a set of processes, procedures, resources, institutions and actors that determine how decisions are made and implemented” (Secco et al. 2011:105). It is about power, relationships, accountability and responsibility exercised by organisations and actors (Graham et al. 2003; Borrini-Feyerabend et al. 2006). Conservation governance arrangements are becoming multilevel and complex (Berkes 2007). Governments are not the only source of environmental decision-making authority and there is a shift from administrative to collaborative state (Koontz & Thomas 2006). Power to make and enforce decisions is distributed among diverse social actors (Lemos & Agrawal 2006), including indigenous, mobile and local communities, local governments, NGOs and the private sector (Borrini-Feyerabend 2003). The change of the scale of governance has been occurring (mostly in the developing countries), and the authority and responsibility to make and enforce decisions are shifted from nation-state to lower-level authorities (decentralization) or to institutions outside the state (devolution) (Agrawal & Gupta 2005; Sikor et al. 2008)

Following the main trends in conservation governance and based on the power distribution and scale of decision-making, type of different actors involved and level and nature of their collaboration, four broad modes of PAs governance can be identified (Borrini-Feyerabend 2003; Borrini-Feyerabend et al. 2006): 1) governance by government, 2) shared governance or co-management, 3) private governance and 4) governance by communities and indigenous people. These governance modes are briefly described in the following paragraphs as each of them may deliver different social and ecological outcomes.

1) Government PAs are governed by the centralised governmental agency (ministry or park agency reporting directly to the government) that enforces decisions, has authority, responsibility and accountability for managing PAs (Borrini-Feyerabend et al. 2006). Government agencies are often considered as legitimate actors that can deliver public benefits and are accountable directly to the public (Baral & Stern 2010). Nevertheless, some authors argue that this 'old' (Peters 2000) hierarchical type of governance is not able to handle size and complexity of PAs (Borrini-Feyerabend 2003). Moreover, state PAs with top-down and exclusionary conservation approach, frequently present in developing world, are being increasingly reported to produce unequal distribution of rights, power and benefits and create social conflicts (Kothari 2008).

2) Co-managed or multi-stakeholder PAs are governance modes where a governmental agency and other stakeholders, such as local/mobile/indigenous communities that depend on the area culturally or for their livelihoods, or user associations, private entrepreneurs and landowners share power and responsibility, make and enforce decisions. Formal decision-making authority might be vested in one agency (often governmental body), but that agency is required by law to collaborate with other stakeholders (Dudley 2008). This collaborative partnership may be materialised through many forms: from consultation to decision-making carried out by consensus (Borrini-Feyerabend et al. 2006). Co-management is frequently labelled as managing relationships, not resources (Natcher et al. 2005; Berkes 2009). However, it is argued that the partnerships in co-management arrangements can be problematic as nature of power sharing makes less powerful partners, such as indigenous people, disadvantaged (Nadasdy 2003).

3) Private PAs where private landowners, individuals, NGOs and other not-for profit and for-profit organisations make and enforce decisions, have control and/or ownership over resources. PAs can be governed by private and non-governmental actors, that might be perceived more efficient than bureaucratic structure of governmental agencies, also providing technical and financial support, bringing new ideas and capacity building (Baral & Stern 2010). However, the legitimacy and accountability of private parties is always limited and questionable, especially due to the vested interests of funding

agencies and reluctance of governments to give authority or legal recognition to private parties (Dudley 2008; Baral & Stern 2010). Moreover, since designation of a private PA is a voluntary act, providing long-term security for conservation may pose a challenge (Dudley 2008).

4) Community conserved areas⁷ are governed and voluntarily conserved by indigenous groups, local and mobile communities through customary laws. Authority and responsibility is vested within communities through a variety of ethnic governance or locally arranged rules and organisation that can be very complex, with diverse management and ownership rights. Community conserved areas depend on the government recognition and respect of community/indigenous rights over the territory (Borrini-Feyerabend et al. 2006). However, community based conservation are criticised to be vulnerable to external drivers and not being able to deal with larger scale biodiversity processes (e.g. management of migratory species) (Berkes 2006).

Fifth, hybrid governance type may be added to this classification as in the reality borders between governance modes are blurred (Rhodes 2005) and this is especially because of complex land and resource ownership rights, diversity in management authority and funding sources (Eagles 2008).

Nevertheless, the importance of the local political processes within PAs is frequently ignored in the conservation effectiveness literature. Therefore, to improve PAs governance and their conservation outcomes, there is need for more clear information on how differences in local governance modes and decision-making processes may cause variability in the outcomes and thus, in the effectiveness of forest PAs.

Four previous Systematic Reviews have addressed the various aspects of community-based conservation, synthesising and assessing primary literature on: 1) development as a conservation tool (Brooks et al. 2006); 2) the effect of local cultural context (Waylen et al. 2010) and 3) broader social - political context on community based management

⁷ Community conserved areas have been relatively recently internationally recognized as a PA at IUCN World Parks Congress in 2003 (Durban) and at the COP VII of CBD in 2004 (Kuala Lumpur) (Kothari 2006b:1)

(Brooks et al. 2010), and 4) community forest management as a mechanism for supplying global environmental benefits and improving local welfare (Bowler et al. 2010). There are two more Systematic Reviews that have a wider conservation focus on terrestrial PAs and their 1) effectiveness in maintaining biodiversity and reducing habitat loss (Geldmann et al. 2013) and 2) securing human-well being (in preparation) (Pullin et al. 2012). This Systematic review is complementary to previous ones, looking from the governance perspective on effectiveness of forest protected areas worldwide; and determining the links between governance processes and multiple conservation outcomes.

Due to high complexity and variety of conservation practices, we will focus our analysis on conservation of forest resources only and on governance of forest PAs. To be defined as a PA, conservation governance arrangements have to: 1) have geographical limits or boundaries; 2) predominantly aim to achieve conservation benefits, but not excluding other related benefits (e.g. social benefits); 3) be designated and managed by legal gazetted means or by non-gazetted, but officially recognized NGO policies or customary laws; 4) have a body of governing rules; and 5) have a clearly identified organization or individual with a governance authority (Kothari 2006a; Dudley 2008). We define forest PAs as “a subset of all protected areas that includes a substantial amount of forest as defined for the purposes of Forest Protected Areas. This may be the whole or a part of a protected area”. This IUCN’s definition excludes commercial plantations and forest managed for industrial purposes within the less strictly protected categories (Dudley & Phillips 2006:19).

Objectives of the Review

We aim to assess relative effectiveness of different governance regimes within forest PAs by contrasting different governance characteristics and processes on the basis of multiple measures of success⁸.

⁸ The outcome measures are adopted from Systematic Reviews by Brooks et al. (2006, 2010, 2013) that employed set of ecological, attitudinal, behavioural and economic measures of success to estimate effectiveness of conservation intervention. However, as Pullin and colleagues (2012) in their review

There are recently quite a few studies that have estimated effectiveness of PAs (e.g. (Rodrigues et al. 2004; Gaston et al. 2008; Porter-Bolland et al. 2012)), but they have focussed solely on the tropics and only few of them assessed PAs effectiveness integrating multiple performance measures (Murray 2005; Ferraro et al. 2011; Granderson 2011). Apart from biodiversity conservation, PAs have various multifaceted and context-dependent objectives (Murray 2005), in both, ecological and the social-economic domain. Examining PAs effectiveness in terms of biodiversity conservation only, might lead to restricted conclusions as it disregards local conflicts and resistance expressed through negative attitudes towards conservation policies and practices and anti-conservation behaviour of local stakeholders; it does not take into account institutional, economical or political changes in surrounding social-ecological systems influenced by PAs (e.g. employment opportunities or migration level) and it may reinforce a fortress conservation mentality (Brechin et al. 2002, 2010; Wilshusen et al. 2002; Hutton et al. 2005; Murray 2005; Hawken & Granoff 2010; Ferraro et al. 2011; Granderson 2011).

In this review, we look at the following outcome measures:

A) Outcome measures within forest PA boundaries:

- 1) Attitudinal success measured through (difference/change in) attitudes of local stakeholders⁹ towards focal PA, authority and/or management practices
- 2) Behavioural success measured through (difference/change in) level of conservation-oriented behaviour necessary to decrease the threats to natural resources (e.g. decrease in level of illegal activities, poaching, etc.)
- 3) Ecological success measured through (difference/ change in) deforestation rate, biodiversity level, maintenance of forest cover and forest density, condition, health.

B) Outcome measures outside of forest PAs boundaries:

focused mainly on social-economical analysis of terrestrial PAs, this review does not assess the economical effectiveness to avoid the potential overlap

⁹ A stakeholder in this study refers to those who affect and those affected i.e. both actively and passively involved individuals, groups or organizations in a PA governance (after (Grimble & Wellard 1997)).

4) Spillover effects in surrounding social-ecological systems i.e. social, institutional and ecological changes on the local level including (Andam et al. 2008): displacement of deforestation and agricultural pressures, preventive clearing at the nearby private land to prevent protective regulation, establishment of private reserves, better law enforcement at the neighbouring land, reforestation initiatives, new employment opportunities and similar. The spillover effects will be included into analysis only if there are reported baseline data against which these effects might be defined and measured (Ewers & Rodrigues 2008). Because of practical reasons, these changes will be recorded only at the local level that might be at a lowest administrative unit where a PA is located (e.g. municipality).

This review aims at answering following primary question:

Does the effectiveness of forest protected areas differ conditionally on their type of governance?

Elements of the primary question are shown in the **Table 2.1.1**.

Secondary question is:

Which characteristics of decision-making process influence the outcomes of forest protected areas?

Based on the aforementioned trends in PA governance, we selected following analytical variables that might describe governance processes:

1) Scale of decision-making:

1.1) Level of decentralization i.e. level of implementation of “subsidiarity” principle (central decision-making, decentralization or devolution);

2) Individual versus multi-actor decision-making:

2.1) Diversification of stakeholders’ categories (one versus multi-actor);

2.2) Nature of stakeholders’ participation (pro-active, consultancy, passive, none);

3) Collaboration among stakeholders in decision-making:

3.1) Nature of collaboration (formal, informal, none);

3.2) Level of collaboration (horizontal/internal, vertical/external, multilevel).

TABLE 2.1.1 ELEMENTS OF THE SYSTEMATIC REVIEW QUESTION

Setting	Perspective	Interest, phenomena of	Comparison	Evaluation
Forest protected areas	1) Local Community 2) PA Authority/Management staff	1) Governmental PAs 2) Co-managed PAs 3) Private PAs 4) Community conserved areas 5) Hybrid forms	Different governance regimes	1) Attitudinal success measured through (difference/change in) attitudes of local stakeholders towards focal PA, authority and/or management practices 2) Behavioural success measured through (difference/change in) level of conservation-oriented behaviour necessary to decrease the threats to natural resources 3) Ecological success measured through (difference/change in) deforestation rate, biodiversity level, maintenance of forest cover and forest density, condition, health, etc. 4) Spillover effects: social, institutional and ecological changes in surrounding social-ecological systems

We assume that governance processes i.e. how decisions are made and implemented, influence level of conservation effectiveness, its ecological and social outcomes. Using theory of change approach, we hypothesise that: **(H1)** making decisions at lowest level possible, **(H2)** collective or multi-actor decision making, **(H3)** high level of proactive participation in day-to-day decision-making and **(H4)** multilevel collaboration among stakeholders can lead to more positive attitudinal, behavioural and ecological success of PAs and decrease negative spillover effects around them.

Methods

SEARCH STRATEGY

We will search for all available evidence relevant to the questions, whether published or unpublished, including both peer reviewed papers and relevant grey literature.

PUBLICATION DATABASES

The general search will be conducted using the following online databases:

- ISI Web of knowledge
- Scopus
- PubMed
- Agricola
- International Development Research Center (IDRC) digital library
- Scienceindex
- Public library of science
- Directory of Open Access Journals
- COPAC
- Social Sciences research network
- Index to Theses Online
- CAB Abstracts

WEB SEARCH ENGINES

Due to repeatability, the web search will be mainly used for reference cross-checks. Following web search engines will be used:

- 1) www.scholar.google.com
- 2) <http://scientific.thomsonwebplus.com/>
- 3) www.scirus.com (web sources only)

Only the first 50 hits of each search will be screened.

ORGANISATIONAL WEBSITE SEARCH

Specific searches will be conducted using the following websites of organisations specialised in the field of (forest) PA management and governance. Where possible, only publication sections of the websites will be used for search. List of websites was compiled from previous Systematic Reviews on effectiveness of PAs and community-based conservation (Brooks et al. 2006, 2010; Bowler et al. 2010; Waylen et al. 2010; Pullin et al. 2012; Geldmann et al. 2013) and completed by including websites of organisations well-known in the field of natural resource governance, forestry and PAs.

<http://www.agter.org/>

<http://www.capri.cgiar.org/>

http://www.catie.ac.cr/Magazin_ENG.asp?CodIdioma=ENG

<http://www.cbnrm.net/>

<http://www.cgiar.org/>

<http://www.cifor.org/>

<http://www.cof.orst.edu/org/istf/ftpp.htm>

<http://www.communityforestryinternational.org/>

<http://www.conservation.org>

<http://www.cooperationcommons.com/>

<http://www.culturalsurvival.org/current-projects/universal-periodic-review>

<http://cfs.nrcan.gc.ca/publications>

<http://community.eldis.org/>

<http://conserveonline.org/>

<http://csid.asu.edu/socecolib>

<http://dec.usaid.gov/index.cfm>

<http://www.dfid.gov.uk>

<http://www.eci.ox.ac.uk/publications/index.php>

<http://www.eldis.org/>

<http://www.etfrn.org>

<http://www.fao.org/>, <http://www4.fao.org/faobib/>

<http://www.firstpeoplesworldwide.org/resources.asp>

<http://www.forest-trends.org/publications.php>

<http://forests.org/>

<http://www.ifad.org/>

<http://www.iied.org>

<http://iog.ca/>

<http://www.indiana.edu/~workshop/publications/index.php>

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<http://www.iufro.org/publications/>

<http://www.lib.umn.edu/cgi-bin/forestry/index.cgi>

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<http://protectedareasandgovernance.groupsites.com>

<http://www.rainforestportal.org/>

<http://www.tropicalforests.ox.ac.uk>

<http://www.un.org/en/>

<http://www.undp.org/>, <http://sgp.undp.org/>

http://web.undp.org/gef/gef_library.shtml

<http://www.unep-wcmc.org/>

<http://www.unep.org>, <http://ekh.unep.org/>

<http://www.wcs.org>

<http://web.worldbank.org>

BIBLIOGRAPHIC SEARCHES

Reference lists of relevant review studies will be searched for relevant primary articles.

SEARCH TERMS

The following English search terms and their various combinations using Boolean operators (AND, OR), wild-cards (for any group of characters (*)) or for a single character (\$) will be used to perform search in the databases and Internet search

engines. Search strings will be adapted to different formats and requirements of databases and search engines to be explored. Specifically, if a website does not allow for complex search strings and Boolean operators, we will use simple search terms such as “protected area”, “governance”, “park”, “reserve”, “biodiversity”, “conservation”.

1) Search string for PA governance and management regimes

“NGO*” OR (non\$governmental and organi\$ation) OR “private nature reserve*” OR “privat*” OR “governme*” OR “community conserved area*” OR “indigenous” or (“comanag*” or “co-manag*”) OR “collaborative” OR “decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR (“integrated and conservation and development”) or “ICDP*” or “governance” or “self-governance” or “institution*” or “rule*” or “norm*” or “polit*” or “polic*” or “paper park*” OR “participat*” or “accountab*” or “legitima*” or ”compliance” or “enforcement*” or “coercion*” or “trust*” or “conflict*” or “exclusion*” or “access” or “local elite*” or “elite capture” or “revenue\$sharing”

AND

“protected area*” OR “nature reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “management area*” or “sacred forest*” or “sacred grove*”

AND

forest*

2) Search string for social outcomes

“attitude*” OR “behavi*” OR “perception*” OR “belief*” OR “perspective*” OR “opinion*” OR “view*”

3) Search string for ecological outcomes

“conserv*” or “deforest*” or “degrad*” or “biodiversity” or desert* or “threaten” or “leakage*” or (“spillover*” or “spill-over*”) or “reforest*” or “afforest*” or (“re-

growth” or “regrowth”) Or “forest clearance” or “land use change” or “land cover change” or “loss*”

We will combine search strings as follows: 1 AND (2 OR 3).

Search strings developed above are the result of numerous iterations performed in ISI Web of Knowledge database. Full record of iterations has been kept and will be further developed while advancing the search. Citations will be imported into an Endnote library and online systematic review software EPPI-reviewer 4.0 (Thomas et al. 2010). Duplicates will be deleted.

STUDY INCLUSION CRITERIA

Relevant documents will be selected by application of inclusion criteria. Inclusion criteria will be first applied to the document title, after to the abstract and in the final phase, to the whole document.

To filter studies based on abstracts, two reviewers will apply inclusion criteria. Repeatability of the application of inclusion criteria will be inspected using Kappa statistics on a sample of abstracts to assess the level of agreement between two reviewers. In case of $\kappa < 0.6$, inclusion criteria will be discussed, re-interpreted and adjusted if necessary. After this procedure is done, only one reviewer will apply inclusion criteria to the rest of the studies.

Relevant subject populations: Biodiversity indicators within and human populations living in and/or around forest PAs.

Relevant interventions/phenomena of interest: Forest PAs under government, co-managed or joint, private and community modes of governance worldwide.

Relevant comparators: comparisons among different interventions (governance regimes). They will follow the appropriate study design explained below. Studies

without relative comparators may be included into analysis as well. Comparators reported within the qualitative study can be created using perceptions or reconstructing the memories of respondents. If present in the study, constructed comparators where external data sets or models are applied to develop scenarios for comparison will be also included into our analysis.

Relevant outcomes:

- 1) Changes or differences in attitudes of local stakeholders towards focal PA governance, authority and/or management practices;
- 2) Changes or differences in level of conservation-oriented behaviour necessary to decrease the threats to natural resources;
- 3) Changes or difference in deforestation rate, biodiversity level within a forest ecosystem, maintenance of forest cover and forest density, condition, health (including fires);
- 4) Social, institutional and ecological changes on the local level that may include for example leakage (i.e. increased pressures on resources shifted outside a focal forest PA) or policy side effects (i.e. positive or negative impacts of a policy instrument on non-focal sectors and activities).

To be included into our analysis, a study has to report on at least two types of outcomes.

Relevant types of study design: Empirical studies using qualitative, quantitative or mixed methods that can be designed as control-intervention site comparisons/case control study, cohort study, case series, cross sectional study, interrupted time series, Before-After/Control-Intervention (BACI design), randomized control trials/control trials.

In case of multiple evidence sources for one PA, data will be combined but the most recent evidence will be prioritised.

Language: Studies published in English.

Following studies will be excluded:

- Studies with a focus on PAs that do not meet the previously mentioned definition of Forest PAs (Dudley & Phillips 2006). This definition is provided in the IUCN Guidelines on use of PA management categories and we will follow and consult it for further clarifications and detailed interpretation.
- Studies with a focus on conservation of a single or a group of species within forest PAs.

POTENTIAL REASONS FOR HETEROGENEITY AND EFFECT MODIFIERS

Set of effect modifiers (predictor variables) that can cause variation in the outcomes are expected to be as follows:

Governance and decision-making characteristics: scale of decision-making; individual versus multi-actor decision-making; nature of stakeholders' participation; level and nature of collaboration among stakeholders;

Resource ownership;

Level of resource access and use by the local actors;

Presence of a local leader;

Source of PA funding;

National context: corruption and illegality, development level, income inequality;

Human population size in and around PAs;

Type of ecosystem and climatic conditions;

Proximity of the forest PA to the urban areas roads, settlements;

PA size;

Time since PA establishment;

More effect modifiers may be recorded and extracted from the primary studies.

STUDY QUALITY ASSESSMENT

Under study quality assessment we refer to aspects of study design important both for reducing susceptibility to bias and ensuring validity with respect to the question. Depending on the methodology of a study, two quality assessment strategies may be applied:

1) Quantitative studies: Quantitative studies will be assessed based on the score assigned to each of the following criteria: 1) appropriateness of control cases and presence of valid counterfactual, 2) controlled for and/or minimized confounding factors, 3) study design category (from highest to lowest score): randomized control trial, non-randomized control trial, BACI (before/after/control/impact) design, interrupted time series study, case control study, cohort study, case series, cross-sectional study, 4) methodology: clarity and completeness of reporting (Brooks et al. 2013). We expect that the (non)randomized control trial studies and full BACI design might be less represented in the PA literature (Geldmann et al. 2013), as it is difficult to meet these study design requirements in conservation policy assessment due to various reasons (non-random allocation of conservation interventions across the landscape, counterfactual thinking is not widespread in conservation assessment exercises, evaluation is usually not a built-in component of a conservation project design, etc. (Ferraro & Pattanayak 2006:483).

2) Qualitative studies: Qualitative studies will be assessed using Harden's methodology (Harden 2007) applied in Rees et al. (2009) and Pullin et al. (2012). This assessment tool uses eight study validity criteria focusing on 1) study design and methods (rigour of sampling, data collection and analysis); 2) findings (how well presented data support findings, quality of findings); 3) use of methods to assess the respondents' perspectives and experiences. A score range will be assigned to each of these criteria. A Qualitative Appraisal Tool (CASP 2006) may be combined for additional assessment details and to

provide guidance for a more structured quality appraisal exercise. This tool is a checklist composed of the ten questions connected to study rigour, credibility and relevance of findings.

Depending on the variability of study quality, decision for the study inclusion may be based on the overall summary score assigned to each study.

DATA EXTRACTION

Data will be extracted from included studies and recorded in a spreadsheet with pre-determined coding. Extracted information across all included studies will be as follows

Study Characteristics:

Objectives and focus of the study;

Study design and methodology for data collection;

Reported study biases ;

Governance characteristics:

1) Scale of decision-making (variable with 3 levels: decision-making out of state (devolution), decision-making vested in lower level/local authorities (decentralization), centralized decision-making);

2) Individual versus multi-actor decision-making described through i) Diversification of stakeholders' categories (2 levels: one versus multi-actor); ii) Nature of stakeholders' participation (4 levels: pro-active, consultancy, passive, none);

3) Collaboration among stakeholders in decision-making described through i) Level of collaboration (3 levels: formal, informal, none); ii) Nature of collaboration (3 levels: horizontal (internal), vertical (external), multilevel);

Institutional, social, economical and political context in which PA governance is embedded:

Resource ownership (state, local, private, mixed);

Level of resource access and use by the local actors measured through 1) IUCN PA management category (1 to 6); 2) Local community dependency on the forest

resources (3 levels: high, moderate, low);

Presence of a local leader (yes/no);

Source of PA funding (4 levels: international, national/governmental, local/communal, private);

National context: corruption and illegality (Governance index score), country development level (Human Development Index score), income inequality (GINI score);

Human population size around PAs (high, medium, low);

Proximity to the urban areas, roads, settlements (high, medium, low);

Time since PA establishment (in years);

PA size (in km²);

Type of ecosystem and climatic conditions (temperate, tropical, boreal);

Comparator type (if any);

Outcome (independent variables):

1) Attitudinal success measured through (level of changes/difference in) attitudes of local stakeholders towards focal PA governance, authority and/or management practices (3 levels: high, moderate, low);

2) Behavioural success measured through (level of changes/difference of) level of conservation-oriented behaviour necessary to decrease the threats to natural resources (3 levels: high, moderate, low);

3) Ecological success measured through (level of changes/difference in) deforestation rate, biodiversity level, maintenance of forest cover and forest density, condition, health (3 levels: high, moderate, low);

4) Spillover effects in surrounding social-ecological systems i.e. social, institutional and ecological changes/differences on the local level that may include leakage or policy side effects (3 levels: high, moderate, low);

Study conclusions including underlying factors of social / ecological change reported

DATA SYNTHESIS

Synthesis will encompass narrative and summary findings of each study and it will be presented in a table and visualised graphically. Attitudinal, behavioural, ecological success and spillover effects will be estimated based on the aforementioned criteria of performance and inferred from the (valid) evidence reported in included studies (using descriptive levels: low, moderate, high).

In order to discern the underlying conditions and determinants of PA success, qualitative and quantitative information to be extracted from the empirical studies will be integrated by pre-determined coding (as shown above in the Section 3.4) and creation of ordinal/categorical variables that will be used in multivariate statistical analyses. Independent variables in the analyses will be 4 measures of success: attitudinal, behavioural, ecological and spillover effects. Dependent variables will be governance characteristics, institutional, economical, political and social setting (effect modifiers). The analyses will be done separately for each governance mode. Finally, comparisons will be done at the final phase and based on the regression results.

We will not infer conclusions about the comparisons between governance regimes if original studies had different counterfactual outcomes i.e. we will not contrast studies that estimated counterfactual of no protection versus counterfactual of a different governance mode. Data extraction and synthesis will be additionally refined during the review process.

In case of missing data in the included studies, we will contact authors and request relevant information.

This review will report methodologies for assessment of forest PAs governance effectiveness, data gaps and potential for future empirical research.

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CHAPTER 2.2.

WHAT EVIDENCE EXISTS ON THE ROLE OF GOVERNANCE IN THE CONSERVATION EFFECTIVENESS OF FOREST PROTECTED AREAS? KNOWLEDGE BASE AND EVIDENCE GAPS

Background

Understanding how governance processes and structures fit to complex social-ecological systems and in-situ forest conservation strategies such as protected areas (PAs) can be crucial for their effective management and for the improvement in the conservation outcomes (Vatn 2005; Rockström et al. 2009).

Governance can be defined in various ways (Giessen & Buttoud 2014a) but for the purposes of this study we define governance in PA context as “a set of processes, procedures, resources, institutions and actors that determine how decisions are made and implemented” (Secco et al. 2011:105). Currently, there is a wide range of governance styles in forest PAs. Based on the number and type of actors involved, responsibility, accountability and power sharing, governing regimes of forest PAs can be classified after (Borrini-Feyerabend 2003; Borrini-Feyerabend et al. 2006) as: 1) governance by government, 2) shared governance or co-management, 3) private governance and 4) governance by communities and indigenous people (see protocol Macura et al (2013) for more details on each of these modes).

There is the rapid growth of the forest conservation governance literature and variety of research approaches to governance analysis and evaluation (Giessen & Buttoud 2014b; Secco et al. 2014). However, knowledge synthesis on how types of local governance and decision-making modes may influence conservation outcomes of forest PAs is still lacking. This is mainly because the evidence on the joint relationships between governance arrangements and ecological or social outcomes is generally missing (Nolte et al. 2013). The research on this topic is still methodologically in a development phase and the causal effects are hard to isolate (Baylis et al. 2015). Consequently, there is no

consensus on the effect of governance modes on conservation outcomes. Moreover, the existing reviews on this or similar topics mainly focus on either social (e.g. West et al. 2006) or ecological effects (Porter-Bolland & Ellis, 2012) separately, and they rarely include information on governance (except some more recent reviews (Pullin et al. 2013; Oldekop et al. 2015)). There is a great value in mapping the existing evidence, creating the knowledge base and identifying knowledge gaps in the literature on role of the governance in the conservation effectiveness of forest PAs in terms of both social and ecological effects. This is a first step in evidence synthesis and the evidence mapping can enable future syntheses exercises.

Here we present results of a systematic map conducted following Collaboration for Environmental Evidence Guidelines (2013). Systematic maps are overview studies that collect, categorize and present the existing evidence on a specific topic of policy or management relevance. They are objective, transparent and repeatable tools for policy makers, practitioners and researchers to 1) identify narrower policy and practice-relevant review questions or 2) evidence gaps (Grant & Booth 2009).

This study aims to describe and map the available qualitative and quantitative evidence from a large number and variety of sources, both peer reviewed and grey literature, and to collate existing evidence on the role of governance in effectiveness of forest PAs. Therefore, we attempt to contribute to the body of previous systematic reviews on effectiveness of PAs (Geldmann et al. 2013; Pullin et al. 2013) by not only collating evidence connected to “what works” but also to “when and why it works”.

In order to describe the current state of the evidence base on how different governance types affect or modify conservation outcomes in forest PAs we created and followed a simple framework (Figure 2.2.1). Based on a developed strategy published in the review protocol (Macura et al. 2013) we mapped the literature on the path from a conservation intervention with a specific governance type to attitudinal, behavioural or ecological outcomes or possible changes in the surrounding social-ecological systems (spill-over effects). The choice of these specific outcomes is based on the previous reviews (Brooks et al. 2006, 2013; Waylen et al. 2010) so the results can be comparable. Nevertheless, here we do not consider economical outcomes of forest PAs as this has

already been synthesised in Pullin et al (Pullin et al. 2013). Due to high complexity and variety of conservation practices and interventions, here we focus on forest PAs only (Macura et al. 2013).

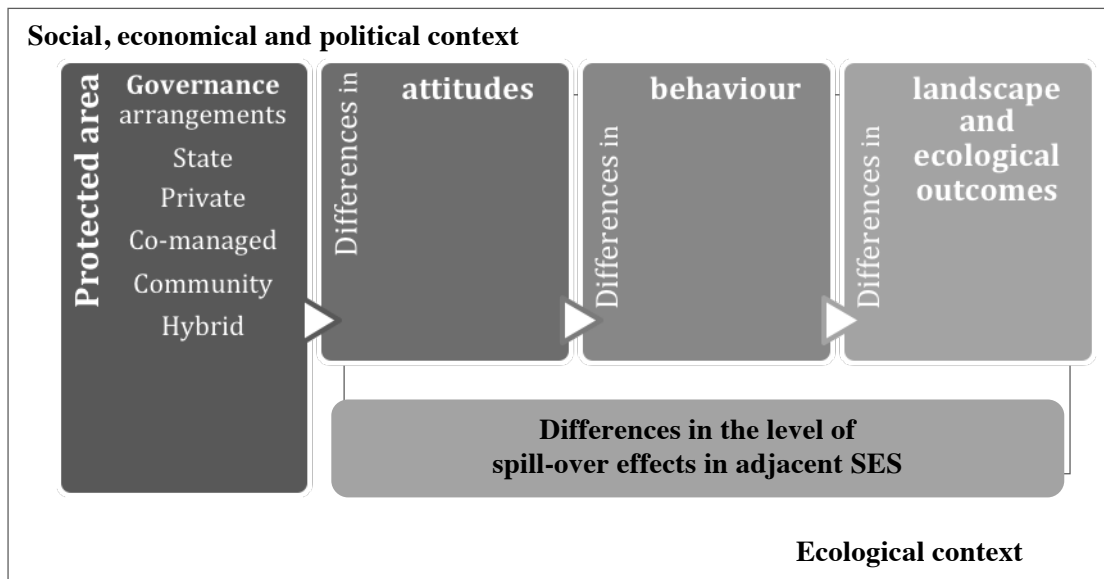


FIGURE 2.2.1 CONCEPTUAL FRAMEWORK WITH DIFFERENT GOVERNANCE ARRANGEMENTS AND FOUR TYPES OF MAPPED EFFECTS: ATTITUDES, BEHAVIOUR, LANDSCAPE/ECOLOGICAL/BIODIVERSITY CHANGES AND SPILL-OVER EFFECTS. SES STANDS FOR SOCIAL ECOLOGICAL SYSTEMS.

Governance arrangements considered in this study were state, private, community and co-managed PAs. We also included studies measuring informal forest PAs effectiveness (e.g. sacred groves). By effective conservation here we mean “positive and measurable effects of conservation policies and practices on biodiversity and target ecosystems, populations, species or habitats” (Macura et al. 2013:8)

Objective of the map

EVOLVING OBJECTIVE OF THIS RESEARCH

We initially planned to conduct a full systematic review, but on preliminary appraisal of the literature we saw more value in mapping the existing evidence, describing its nature, size and knowledge gaps. We believe this is a more appropriate approach for the topic

area, which appeared too broad and divergent for a single systematic review exercise. This was not foreseen during the protocol preparation aimed at guiding systematic review synthesis, but only in the later stages of the reviewing process.

Consequently, this review is created in a form of a systematic map to catalogue and collate the evidence across a wide range of criteria, such as study location and design, methodology, type of intervention and comparator. We conducted mapping and coding of the relevant full text articles.

PRIMARY AND SECONDARY OBJECTIVES

This study identifies, appraises and describes nature and distribution of the primary research to answer:

What evidence exists on the role of governance in the conservation effectiveness of forest protected areas?

Map question components are as follows:

Setting: Forest PAs

Perspective: 1) Local Community; 2) PA Authority/ Management staff

Phenomena of interest: 1) Governmental PAs; 2) Co-managed PAs; 3) Private PAs; 4) Community conserved areas; or 5) Hybrid governance forms.

Comparator: Different governance regimes, which can include other types of PAs or other types of forests (governed by communities, state or privates)

Outcomes: 1) Attitudinal effects measured through (difference/change in) attitudes of local stakeholders towards focal PA, authority and/or management practices 2) Behavioural effects measured through (difference/change in) level of conservation-oriented behaviour necessary to decrease the threats to natural resources 3) Ecological effects measured through (difference/change in) deforestation rate, biodiversity level, maintenance of forest cover and forest density, condition, health, etc.; and 4) Spill-over effects: social, institutional and ecological changes in surrounding social-ecological systems.

Despite change in objective from the systematic review to systematic map, the question components, except some modification in the comparator, remain the same.

Secondary objectives and map outputs are to:

- 1) Create interactive, searchable and evidence database on the role of governance in the effectiveness of PAs for use by researchers, practitioners, policy-makers and the public;
- 2) Show the extent and distribution of the current knowledge base
- 3) Identify evidence gaps according to: a) regions and countries; b) outcomes: ecological, social, spill-overs; c) interventions: governance modes
- 4) Provide preliminary and brief overview of the variations in the research quality and deficiencies in the methodology
- 5) Provide directions for improvement of the quality of evidence
- 6) Generate ideas for new research questions to inform future primary research or evidence syntheses

Methods

As this study is an evidence map rather than the full systematic review, the final methodology is different than the one published in the protocol (Macura et al. 2013). To reflect the current state of the evidence base, we adapted primary and secondary research objectives from the protocol and did not undertake full critical appraisal, data extraction and synthesis. Moreover, we made modifications and amendments to the inclusion criteria adapted to the new objectives. We also modified the title to reflect the current map content. Full explanation of the amendments to the inclusion criteria is written under section titled *“Amendments and clarifications to the inclusion criteria published in protocol”*.

SEARCHES

Search terms

To identify suitable search string, a scoping exercise was undertaken, a search string produced and published in the protocol. The terms of the full search string include keywords connected to setting (forest PA), phenomena of interest (PA management and governance regimes) and three types of outcomes. Details of the scoping exercise along with the final search string used to extract references from the ISI Web of Knowledge (WOK) database (and database settings used for searches) are available in the **Annex 1**.

The search was performed in two phases. The original search was conducted in 2012 and it was updated in March 2015. We attempted to decrease the sampling bias of published and unpublished literature by using several information sources for the first search. List of databases, search engines, specialist sources and search terms used to identify relevant literature was published in the protocol (Macura et al. 2013) and are listed again below with some minor adjustments (we excluded irrelevant websites and conducted search in two more publication databases). The updated search (March 2015) was conducted through WOK database only. We based this decision on the observations from conducting the first search that resulted in significant number of duplicates obtained through searches conducted in databases other than WOK where WOK had the highest number of search hits and appeared the most comprehensive database. We searched WOK database without lemmatization, all year ranges and in English language only.

All the search results were imported in EPPI-reviewer (Thomas et al. 2010) where duplicates were removed and their number was recorded.

Publication Databases

The search included the following online databases:

1. ISI Web of knowledge
2. Scopus
3. PubMed
4. Agricola
5. Digital library of International Development Research Center
6. Scienceindex
7. Public Library of Science
8. Directory of Open Access Journals
9. COPAC
10. Social Sciences Research Network
11. Index to Theses Online
12. ProQuest (theses and journals)
13. CAB Abstracts
14. EconPapers
15. Digital Library Of The Commons

The search string was shortened in some cases depending on the database search facility (see the **Annex 2**).

Organisational websites search and specialist sources

Following organizational and specialist websites (47 in total) were searched for grey literature, using multiple (3 on average), simple and shortened search strings or single key terms, depending on the search facilities of the website and details are in the **Annex 3**.

1. Online Knowledge Base: Natural Resources Governance around the World:
<http://www.agter.org/>
2. CGIAR System-wide Program on Collective Action and Property Rights:
<http://www.capri.cgiar.org/>
3. CGIAR -a global agricultural research partnership: <http://www.cgiar.org/>
4. CATIE: http://www.catie.ac.cr/Magazin_ENG.asp?CodIdioma=ENG
5. The Community-Based Natural Resource Management Network:

- <http://www.cbnrm.net/>
6. CIFOR- Center for International Forestry Research: <http://www.cifor.org/>
 7. Forest, Trees and People Program: <http://www.cof.orst.edu/org/istf/ftpp.htm>
 8. RECOFCT -the Center for People and Forests: <http://www.recoftc.org>
 9. International Society of Tropical Foresters:
<http://www.istf-bethesda.org/index-english.html>
 10. FAO Forestry: <http://www.fao.org/forestry/FON/FONP/cfu/cfu-e.stm>
 11. FAO Document repository: <http://www.fao.org/documents/en/search/init>
 12. FAO Catalogue online: <http://www.fao.org/>, <http://www4.fao.org/faobib/>
 13. Community Forestry International:
<http://www.communityforestryinternational.org/>
 14. Conservation International: <http://www.conservation.org>
 15. Cooperation Commons: Interdisciplinary study of cooperation and collective action. <http://www.cooperationcommons.com/>
 16. Cultural Survival:
<http://www.culturalsurvival.org/current-projects/universal-periodic-review>
 17. Canadian Forest Service: <http://cfs.nrcan.gc.ca/publications>
 18. The Eldis Communities: <http://community.eldis.org/>
 19. ConserveOnline: <http://conserveonline.org/>
 20. USAID - Development Experience Clearing House database:
<http://dec.usaid.gov/index.cfm>
 21. UK Department of International Development: <http://www.dfid.gov.uk>
 22. Environmental change institute, Oxford University:
<http://www.eci.ox.ac.uk/publications/index.php>
 23. Eldis: <http://www.eldis.org/>
 24. European Tropical Forest Research Network (ETFRN): <http://www.etfrn.org>
 25. First Peoples Worldwide: <http://www.firstpeoples.org/>
 26. Forest Trends: <http://www.forest-trends.org/publications.php>
 27. Forests Protection Portal: <http://forests.org/>
 28. International Fund for Agricultural Development (IFAD): <http://www.ifad.org/>
 29. International Institute for Environment and Development: <http://www.iied.org>
 30. Institute on Governance: <http://iog.ca/>

31. IUCN World Commission on Protected Areas:
<http://www.iucn.org/about/union/commissions/wcpa/>
32. International Union of Forest Research Organizations (IUFRO):
<http://www.iufro.org/publications/>
33. World's Environmental Library:
<http://www.nzdl.org/fast-cgi-bin/library?a=p&p=about&c=en>
34. World Wildlife Fund For Nature: <http://wwf.panda.org>
35. Poverty and Conservation: <http://povertyandconservation.info/en/bibliographies>
36. Protected areas and governance group-site:
<http://protectedareasandgovernance.groupsites.com>
37. Rainforest Portal: <http://www.rainforestportal.org/>
38. Oxford Centre for Tropical Forests: <http://www.tropicalforests.ox.ac.uk>
39. United Nations: <http://www.un.org/en/>
40. United Nations Development Programme: <http://www.undp.org/>
41. Global Environmental Facility (GEF):
http://web.undp.org/gef/gef_library.shtml
42. GEF -Small Grants Programme: <http://sgp.undp.org/>
43. UNEP-WCMC World Conservation Monitoring Centre: <http://www.unep-wcmc.org/>
44. United Nations Environmental Programme: <http://www.unep.org>,
<http://ekh.unep.org/>
45. Wildlife conservation Society: <http://www.wcs.org>
46. World Bank: <http://web.worldbank.org>
47. Nature Conservation Research Centre: <http://www.ncrc-ghana.org/>

ESTIMATING THE COMPREHENSIVENESS OF THE SEARCH

Comprehensiveness of the search in the database was checked through the bibliographic and Internet searches:

- a) Supplementary - Bibliographic search

We searched manually through bibliographies of 10 relevant key reviews to check if all the relevant articles were identified in the previous searches. We included missing relevant articles. The results of this search are in the **Annex 4**.

b) Internet search

We used Google Scholar (www.scholar.google.com) to check the comprehensiveness of the search. We used 4 different search strings, as the original search string was too long. For each string we screened first 160 hits (this is empirically-informed cut-off point based on the decreasing relevance of the hits). The results of this search are in the **Annex 5**.

ARTICLE RETRIEVAL

We retrieved full text articles digitally (as PDF files) and where needed, we used subscriptions of Bangor and Padova Universities. Where we have not had access to the articles, we contacted authors directly when possible (via email or ResearchGate).

ARTICLE SCREENING AND STUDY INCLUSION CRITERIA

According to the inclusion criteria presented below, the first author screened and included studies through three stages. First, titles, thereafter the abstracts and finally, the full-text articles were assessed against the inclusion criteria. Grey literature was screened directly at the full text level, as there are frequently no abstracts in these publications.

In order to check the consistency of inclusion, all three authors independently reviewed a small set of abstracts (78). Inclusion decisions were compared and all disagreements were discussed. Inclusion criteria were clarified and improved before continuing with the screening procedure of remaining abstracts. The identical procedure was applied for the full-text screening on a sample of 12 articles.

We applied the following inclusion criteria while screening studies:

Relevant population: forest PAs with or without human populations

Relevant interventions/phenomena of interest: State, co-managed or joint, private and community modes of governance as well as informal forms of governing through local institutions (e.g. sacred groves).

Relevant comparators: comparisons among governance regimes, that are 1) changed over time in a single PA; 2) PAs with different governance regimes; 3) forests with defined governance regime.

Relevant outcomes:

- 1) Changes or differences in attitudes of local stakeholders towards focal PA governance, authority and/or management practices;
- 2) Changes or differences in level of conservation-oriented behaviour reported to decrease the threats to natural resources;
- 3) Changes or difference in deforestation rate, biodiversity level within a forest ecosystem, maintenance of forest cover and forest density, condition, health (including fires) or any other biodiversity indicator;
- 4) Social, institutional and ecological changes around PA and on the local level that may increased pressures on resources outside a focal forest PA (leakage or policy side effects)

Language: English only.

Publication Date: No date restrictions were applied during the inclusion.

Studies that could not be obtained are listed in the **Annex 6**. Excluded studies are listed along with reasons for exclusion in the **Annex 7**.

AMENDMENTS AND CLARIFICATIONS TO THE INCLUSION CRITERIA PUBLISHED IN THE PROTOCOL

While in the protocol the number of outcome types per study was stated to be not less than two per study, we disregarded this criterion as most of the studies had only one outcome.

We focused only on studies that were conducted at the local PA scale, and studies on regional and national scales, e.g. analysing national-level conservation policy and their outcomes, were rejected.

Studies describing PA establishment (or conflicts prior to establishment) were not included. Moreover, studies on introduction of new institutional mechanisms and outreach projects (such as establishment of local community management committees, integrated conservation and development projects) were frequently missing required outcomes (despite of sufficient details on the processes and governance arrangement) and therefore excluded. We included studies on integrated conservation and development projects only if they are formulated as a specific co-management arrangement between PA managers and local people and we excluded them if they are presented as purely an incentive or compensation project.

Articles on the informal PAs, such as sacred groves, are added to the map. Although they might not fit into the PA definition as state governments rarely recognize them, there is potential in learning from the case of persistence or deterioration of informal and traditional institutions (governed through taboos or religious beliefs) in protecting the forest resources (Colding & Folke 2001). This is especially relevant in situations where informal external rules are not easily enforced (Jones et al. 2008). Nevertheless, very frequently such studies provide botanical inventories of sacred groves only and are not designed with the appropriate comparator to show the comparative value of such conservation modes and in such cases they could not be included in this map.

Studies on mangrove PAs were included too in accordance with the IUCN guidelines on the definitions of forest PAs (Dudley 2013).

We extended comparator definition. Namely, studies with comparator other than formal PAs were also included. These comparators were other types of forests under various governance arrangements (communities, state or private) and this is noted in the map.

STUDY CODING

Articles selected for full text inclusion were exported from EPPI reviewer to a spreadsheet where we applied coding of the reported studies.

Coding was undertaken using the full-text and predefined keywords generated from the primary question and connected to the various aspects of study setting and design, including the information on the article, type of methodology used, type of governance, description of outcomes and comparators. Some of the keywords based on the topics reported in the articles were identified and added to the database during the mapping process. The coding tool with definitions of codes is described in the **Annex 8**.

Each line in the database represents a single study. Articles that report part of the bigger study (same group of authors, research spanning over same years and with the same research location) have been entered as separate lines in the database, but they are marked as “linked studies” and connected with the same study ID number. Moreover, if the article is not a stand-alone article, but just gives the contextual information to the main study, this is marked as a “background study”.

The first author coded all the studies and the other two authors checked coding consistency by reviewing coding decisions on a small sample of included studies (7). All disagreements were discussed and coding consistency was adjusted accordingly.

CRITICAL APPRAISAL

The database includes general comments on the internal validity of the studies and the potential biases in the methodology. External validity was not assessed. Specifically, we coded four different variables: 1) the level of methodological detail (low, medium and high), 2) appropriateness of comparator (descriptive category); 3) type of measurements of ecological or behavioural outcomes (subjective and perception based or objective, measured with specific instruments), 4) study design.

A subset of studies (7) was critically appraised and coded by all three authors and all disagreements regarding coding of critical appraisal were resolved and clarified.

Table 2.2.1 provides an overview of the critical appraisal coding system. More detailed definitions of the critical appraisal variables and their coding system are in the **Annex 8**. We extracted the characteristics of the studies that might be useful for judgement of reliability in future evidence syntheses, but we have not undertaken the full quality appraisal.

TABLE 2.2. 1 ELEMENTS OF CRITICAL APPRAISAL AND THEIR CODING. (STUDY DESIGNS CATEGORISATION ADAPTED FROM (HARRIS ET AL. 2006; LANGERICH 2015))

<p>1. Study design</p>	<p>Case study: in-depth non-experimental qualitative study of a single location/protected area/local community within, usually studied over time in a real life context, using documents, interviews, observations. Frequently reports on unusual, extreme or rare cases</p> <p>Case series or Time series: quantitative non-experimental study in multiple time periods, outcomes measured during the intervention. If measurements before and after intervention – Before-After (BA) design</p> <p>Cross-sectional study (Control-impact (CI)): quantitative non-experimental study conducted in one point of time (e.g. survey), provides a snapshot. Not clearly established if intervention preceded the measured outcomes. Has non-randomly selected control groups.</p> <p>Controlled before-and-after study (Before-After-Control-Impact (BACI)): quasi-experiment with controls, measure of outcomes before and after the intervention</p> <p>Controlled after only study: quasi-experiment with controls, measure of outcomes after the intervention ONLY</p> <p>Sequential mixed method: qual>quant OR quan>qual</p> <p>Concurrent mixed method design: qual and quant at the same time</p>
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2. Comparator appropriateness	Is comparator appropriate for governance assessment? Is it relevant for the stated aims and conclusions of the study? Other methodological details? Describe
3. Methodological detail	LOW =no sufficient details on data collection and/or data analysis procedures, method selection not justified, MEDIUM = no important methodological details missing, selection of methods justified and fits the research question; HIGH =very detailed explanation of the data collection and analysis procedures, info on ethical approval included, study limitation, confounding and biases commented upon
4. Measurements of ecological outcomes	Subjective/perception based or self-reported (=0); Objective (=1). E.g.: changes in the forest cover assessed through analysis of satellite images versus perception of the changes in forest cover reported by the local people);

Results

EVIDENCE IDENTIFICATION, RETRIEVAL AND SCREENING

All steps in evidence identification, retrieval and screening, along with the numbers of included and excluded studies at different stages of the mapping process are depicted in Figure 2.2.2.

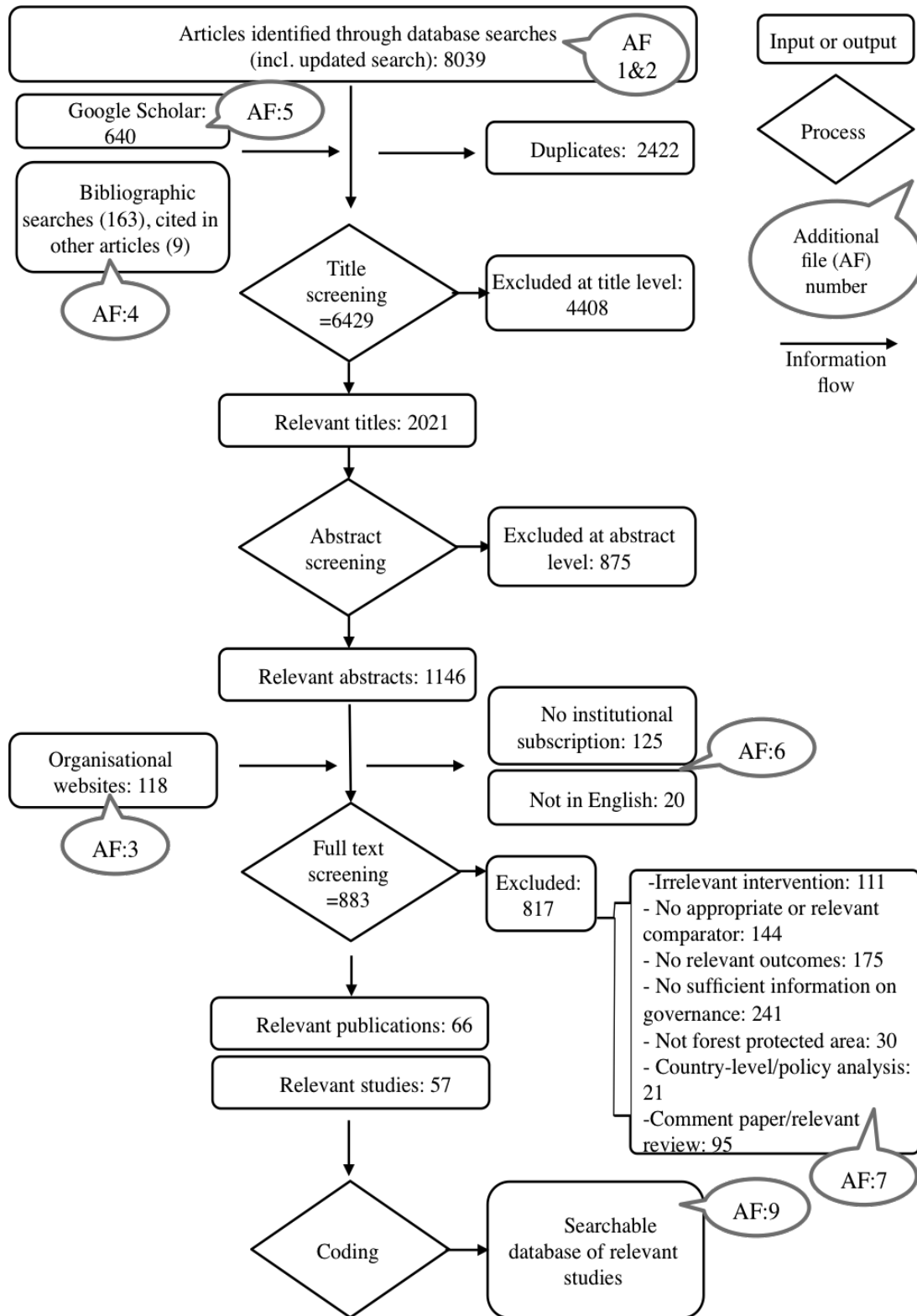


FIGURE 2.2.2 FLOW DIAGRAM OF MAPPING STAGES FROM SEARCHING, IDENTIFICATION OF RELEVANT LITERATURE AND CODING. LOCATIONS OF THE OUTPUTS OF SPECIFIC MAPPING STAGES PLACED IN THE ANNEX FILES (AF) ARE ALSO DEPICTED.

Searches of academic literature databases, undertaken in July and November 2012 and updated in March 2015 identified 8039 potentially relevant articles (this includes 1256 potentially relevant titles from the updated search). Additional sources, such as bibliographic checking (163), references extracted from other articles (9) and Google Scholar search (640) yielded additional 812 articles. After duplicate removal (2422), 6429 articles were screened at the title level out of which 2012 titles were identified as relevant and were screened at abstract level. 1146 abstracts were identified for the full-text screening, while 875 abstracts were excluded. Moreover, searching through organizational websites resulted in additional 118 potentially relevant articles (duplicates deleted: 1). We screened 1119 articles at the full-text level and we could not assess 145 full-text articles due to lack of institutional subscription (125) or because publication were not in English (20).

At the full-text screening step we excluded 817 articles. Reasons for exclusion were: not a primary research study (e.g. relevant review without empirical data), (95), country-level analysis (e.g. a national level forest conservation policy assessment) (21), no appropriate comparator (comparator lacking or its simple inside/outside comparison) (144), irrelevant intervention (e.g. agroforestry) (111), lack of relevant outcomes (e.g. economic costs of PAs) (175), insufficient information on governance (i.e. no detailed explanation on governing and management bodies), (241), non-forest PA (30).

In total, we coded 66 articles that correspond to 57 studies. To be a part of a single study, articles had to be authored by the same group of authors and have the same research location where research is conducted within similar time period.

SYSTEMATIC MAP DATABASE

A searchable systematic map database was created aimed at describing the scope of the current research, evidence type and location. A link to the downloadable database (.xlsx format) is provided in the **Annex 9**. The map can be searched through different keywords and attributes on the article or study level, to provide insights of the

knowledge base size and gaps (in terms of geographical location, governance type, outcome, methodology) and to be a source of questions for future systematic reviews.

DATABASE DESCRIPTION AND FINDINGS

Below is the descriptive summary of the database. We left out from this summary less important coded information such as PAs sizes and year of establishment.

We included 9 background publications that could not be stand-alone studies but served as a contextual support to the main publication in the study by providing background on governance processes or describing additional outcomes.

The oldest included article published in 2002. 46.97% of all the included relevant articles were published from 2010 to 2014. Figure 2.2.3 shows the yearly increase of published relevant articles.

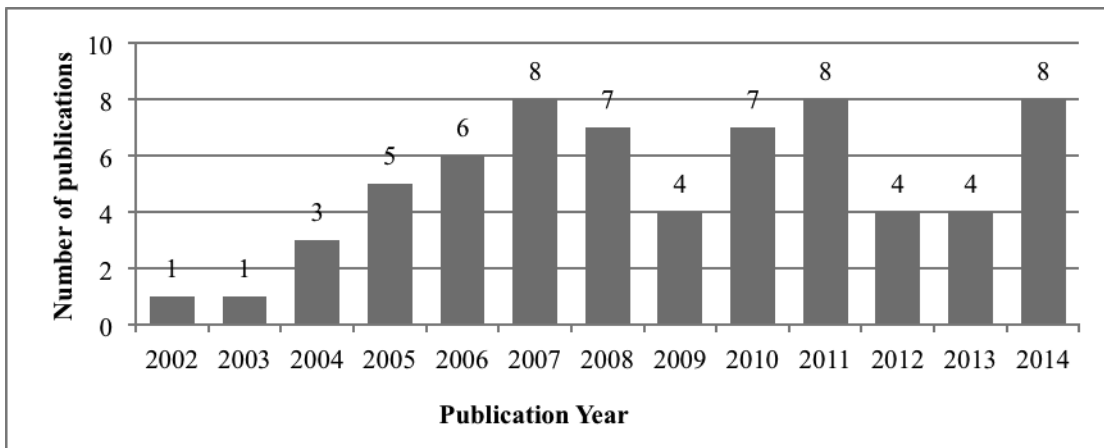


FIGURE 2.2.3 NUMBERS OF ARTICLES INCLUDED IN THE MAP BY PUBLICATION YEAR (TOTAL NUMBER OF INCLUDED ARTICLES IS 66).

Academic authors published majority of the articles included in this map (60.6%, 40 out of 66) and this was followed by a combined authorship between academic and NGO-affiliated authors (22.72%, 15). Most of the included publications were peer-reviewed (98.5%, 65 out of 66), out of which 84.8% were journal articles. The majority of the studies included in the map applied quantitative methodology (34 studies; 59.6%) and mix-method (15; 26.3%), while qualitative studies were represented in a lesser extent

(8; 14%). One out of 57 included studies was a simulated experiment (Vallino 2014), four were quasi-experimental studies and the rest were observational studies.

Research locations of the included observational and quasi-experimental studies were placed in 26 countries. Study locations were biased towards Latin America (35 study locations) and Asia (17), while only few studies were located in Europe (5) and Africa (5). Mexico was the most studied country (7 studies) followed by Nepal (6), India (5), Bolivia (5) and Brazil (5) (Figure 2.2.4). Most of the studies were located in a single country (50), while only five studies had included two countries, and only one study showed cases from three countries.

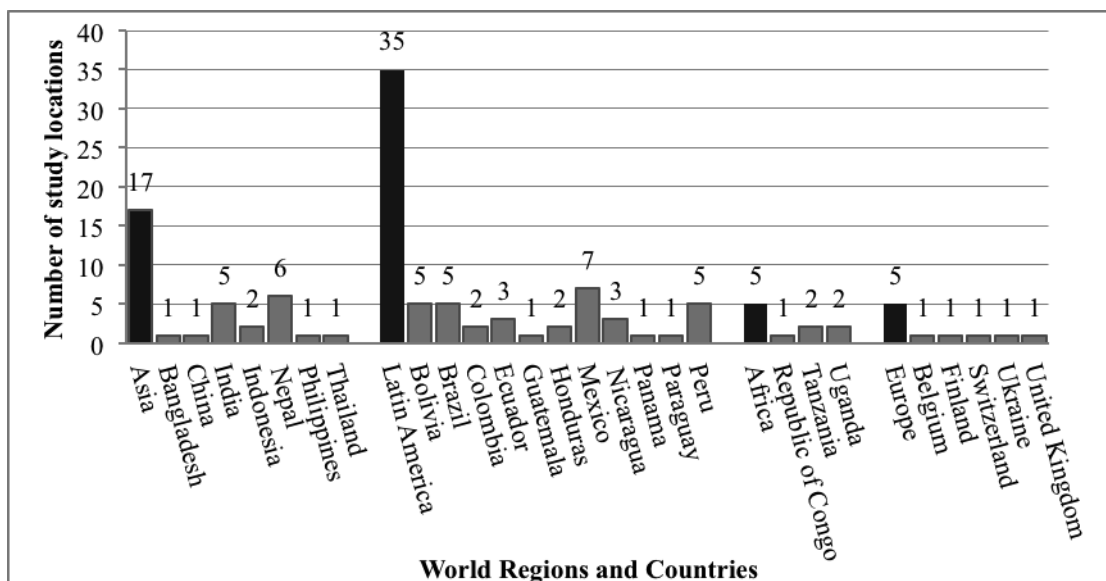


FIGURE 2.2.4 NUMBER OF STUDY LOCATIONS PER COUNTRY AND PER CONTINENT/REGION. LOCATIONS WITHIN MULTI-SITE STUDIES ARE COUNTED SEPARATELY

In 28 studies (out of 56 observational and quasi-experimental studies; 50%) the information on IUCN management categories was not available. In some studies, this information could be obtained only for some PAs in the sample. This is because IUCN management categories were not reported (neither in the publication nor on protectedplanet.net), or studied forests could not be categorised (e.g. sacred groves and other informal PAs). Where this information was available, IUCN management categories of studied PAs were various: from II to VI (only one publication was dealing

with PAs under management category I), implying high variability of resource access and strictness levels.

There is a high variability in sample sizes. Out of 56 observational and quasi-experimental studies, 15 focused on only one PA, 8 studies focused on 2 PAs. The rest of the studies (33 or 59%) encompassed three or more (formal and informal) PAs in the analysis, including adjacent forest patches of different governance, ownership or tenure arrangement. The highest number of PAs compared in a studies was 163 (Armenteras et al. 2013) and 292 (Nolte et al. 2013)

Variety of reported outcomes

Most of the studies reported only one outcome (45) predominantly measuring only ecological effects (38). Nine studies reported two outcomes out of which 5 studies focused on both social and ecological effects and the rest measured social effects only. Three included studies reported three outcomes (ecological, behavioural and attitudinal). Spill-over effects or “neighbourhood leakage” (Gaveau et al. 2009) were not captured by our map. Studies that were reporting on the potential spill-over effects were missing information on governance and were excluded. Majority of reported outcomes were categorized as ecological (46), followed by behavioural (15) and attitudinal (11) (Table 2.2.2).

TABLE 2.2.2 NUMBER AND KIND OF REPORTED OUTCOMES PER STUDY (TOTAL NUMBER OF MAPPED STUDIES IS 57).

Studied outcome types	Ecological	Attitudes	Behaviour	Spill-over	Total no. of studies
Four	0	0	0	0	0
Three	3	3	3	0	3
Two	5	6	7	0	9
One	38	2	5	0	45
Total	46	11	15	0	57

Ecological outcomes reported were: land use change assessed through forest cover change, annual deforestation rate and fragmentation (patch area); level of forest regeneration; biodiversity assessment through stand inventories and biodiversity richness/abundance and biomass, community structure (density and composition, occurrence of endemic, threatened species and medicinal species), fire.

Attitudinal outcomes reported: attitudes and relationship (level of trust or satisfaction) of local people towards management authorities, PA policies (rules), conservation practice and biodiversity, perception of PA management effectiveness.

Behavioural outcomes reported were: compliance and collaboration (voluntary conservation activities, fire watching, protection of resources and other types of collective action), conflicts with PA authorities (e.g. (Norgrove & Hulme 2006): mobilization of large groups/politicians, feigning ignorance, not turning up for meetings, letting roads become overgrown, bribing park staff and moving boundary markers under cover of darkness), illegal activities (encroachment, hunting, fire) or non-conservation oriented behaviour (firewood consumption, livestock breeding, hunting); occupation changes.

Governance modes

Included studies were analysing and comparing all four governance types, including state, community, private (incl. NGO-governed) and co-governed PAs with various and often complex combinations of land tenure types, involvement of external actors and power sharing. More detailed information on governance characteristics, such as nature of stakeholder participation, level of decentralization, level and nature of collaboration among actors was frequently lacking in the majority of the studies and these variables were not coded (as initially planned (Macura et al. 2013)).

The majority of studies (51) included state governance type in a comparative analysis. A study by Mehring and colleagues (2011) dealt with a state PA that includes

community conservation, with negotiated conservation agreements and was classified under state PA governance.

Forty-two studies encompassed some form of community governance and this included forests managed for religious purposes such as sacred groves (e.g. (Bhagwat et al. 2006)), indigenous reserves and territories (e.g. (Armenteras et al. 2013)), extractive reserves (e.g. (Ruiz-Pérez et al. 2005)), community concessions (e.g. (Bray et al. 2008)), community or decentralized forests (e.g. (Hayes & Persha 2010)) or communal lands such as *ejidos* in Mexico (e.g. Rueda, 2010).

Twenty studies included some form of governance by private actors out of which six studies inquired private PAs owned by an individual, a company, NGOs or non-for-profit trust foundation (Quintana & Morse 2005; van Gils & Ugon 2006; Clercq & Wulf 2007; Sánchez-Azofeifa et al. 2009; Urquiza-Haas et al. 2011; Vuohelainen et al. 2012). A study by Mönkkönen et al (2010) investigated voluntary conservation agreements on the private forests in Finland. The rest of the studies included mostly forest concessions (managed not only for conservation purposes) that were used as a comparator to other conservation governance regimes.

Twelve studies included co-managed PAs or some other form of participatory conservation out of which two studies (Gubbi et al. 2009; Chowdhury et al. 2014) described effects of integrated conservation and development projects within state PAs.

Some studies could not easily be classified under our four governance categories. Annapurna conservation area in Nepal has a complex governance setting with community-led committees inside a national PA, managed by a NGO/trust (Baral & Stern 2011). Quintana and Morse (2005) included a state-run PA with private land ownership, and this was coded as state governance. Vallino (2014) simulated external law enforcement, application of internal rules and open access scenarios in conservation and forest management.

Figure 2.2.5 gives an overview of the governance modes in the included studies.

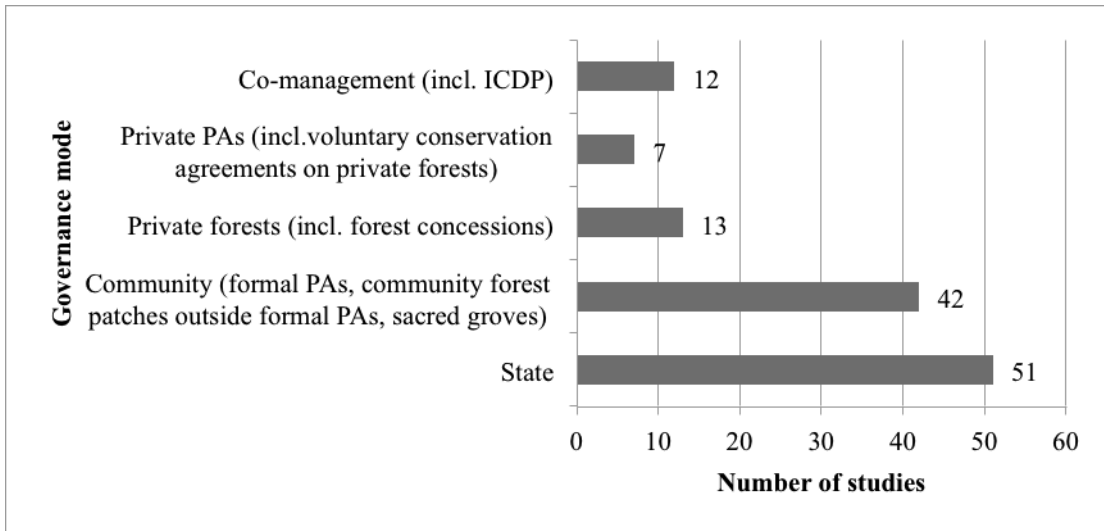


FIGURE 2.2.5 GOVERNANCE MODES IN INCLUDED STUDIES (PAS AND NON-PAS), COARSELY GROUPED (N=57)

Comparator types

Out of 57 studies, 10 studies compared governance within the same PA over time, 15 studies compared different PA governance regimes; and 2 studies compared intervention against no intervention. 30 studies compared PAs with various governance regimes against similar forestry areas under private concessions, or community forestry patches outside the PAs.

Figure 2.2.6 provides an overview of the nature of comparators and Table 2.2.3 shows all the included studies, mapped outcomes, comparators and governance types.

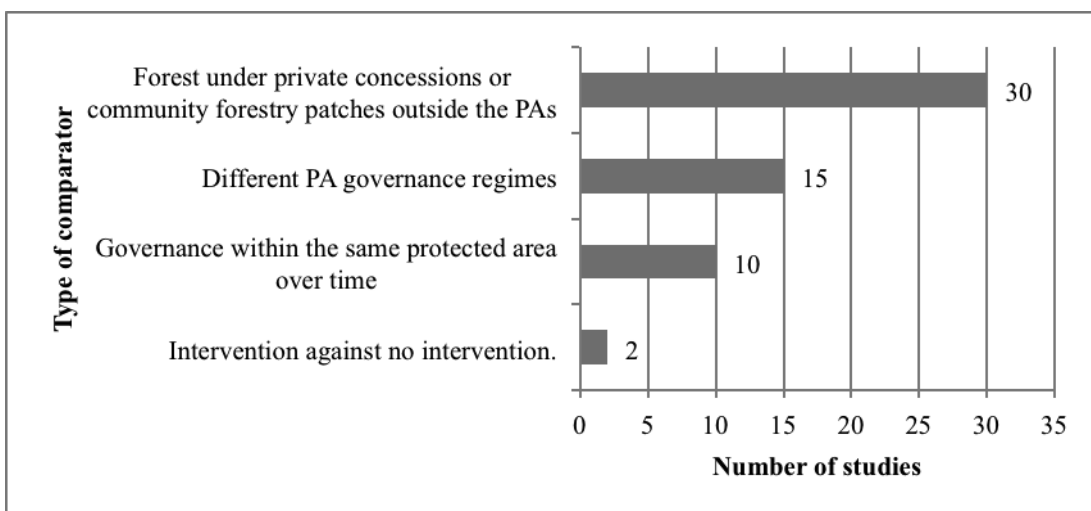


FIGURE 2.2.6 NATURE OF STUDY COMPARATORS IN INCLUDED STUDIES (N=57).

TABLE 2.2.3 OVERVIEW OF THE MAPPED GOVERNANCE MODES, OUTCOMES AND COMPARATORS. GOVERNANCE MODES ARE CODED AS FOLLOWS: STATE (=1), PRIVATE (=2), NGO (=3), COMMUNITY (=4), CO-MANAGEMENT (=5), HYBRID/OTHER (DESCRIBE). COMPARATORS ARE CODED AS FOLLOWS: GOVERNANCE CHANGE OVER TIME IN THE SAME PA (=1); GOVERNANCE COMPARED TO OTHER GOVERNANCE REGIME IN DIFFERENT PAS OR TO AN OTHER GOVERNANCE TYPE WITHIN THE SAME PA DURING SAME TIME PERIOD (=2), OR IN DIFFERENT FOREST GOVERNANCE REGIMES DURING SAME TIME PERIOD (3); OTHER (DESCRIBE). OUTCOMES ARE CODED AS ECOLOGICAL (=1); ATTITUDES (=2); BEHAVIOUR (=3); SPILL-OVER (=4).

Study ID	Short Reference	Protected area name	Outcomes	Detailed Outcome	Governance mode	Comparator
101	Armenteras DR et al. 2009	Various in Colombian Guyana Shield: Chiribiquete, Macarena, Nukak, Puinaway. Tuparro, Barranco Colorado, Barranquillita, Cano Mesetas-Dagua y Murcielago, El itilla, Cano Bachaco Guaripa, La Hormiga y Guacamayas Maipore, Lagos del Dorado, Lagos del paso, Bacat-Arara, Vuelta del Alivio, Yabilla II, Barranco Ceiba y Lag, Cano Jabon, Cuenca Media y alta del rio Inirida, Nukak Maku, Parte alta del rio Guainia, Remanso Chorro Bocon, Rios Cuiari e Isana, Tonina-Sejal-San Jose, La Fuga, La Sal, Llanos de Yari (Yaguara II), Piaroa de Cachicamo, Puerto Nare, Puerto Viejo y puerto Esperanza, Tucan de Caño Giriza La Palma	1	Land cover changes between 1985 and 2002 (%)	1 and 4 (national and indigenous reserves)	2 (incl. inside/outside comparison)

102	Bajracharya SB, 2005	Annapurna Conservation Area	1, 2, 3	1) Ecological: Density, basal area, species diversity and species evenness of all the trees \geq 10 cm DBH; wildlife abundance changes; 2) Behaviour: resource use and hunting behaviour (count and sighting), 3) Attitudes: attitudes towards conservation (percentage agree)	4	1: Other: local people's perceptions of change (1), also compared with adjacent areas under traditional forms of land use (but no information on governance there)
103	Baral N et al., 2011	Annapurna Conservation Area, various community forests	1, 2	1) Ecological: improvement of the state of natural resources and effective conservation efforts (scale and percentage agree); 2) Social: Trust towards administering bodies and feeling of their importance (scale 1-5 and %)	Other: 1, 3, 4: community-led committees inside national PA managed by a NGO/trust compared to state managed community-led committees outside PA	2
104	Bhagwat S et al. 2005	Sacred groves in Kodagu District, Karnataka	1	Trees, birds, and macro-fungi: Diversity, species distribution and attributes: pairwise similarity in species composition, comparison between sites in habitat preferences, occurrence of endemic and threatened species, and useful and medicinal species.	1, 4 (informal community based governance (sacred groves)), surrounding landscape with coffee plantations	3

105	Bray D et al. 2008	Calakmul Biosphere Reserve (CBR, Mexico) and Maya Biosphere Reserve (MBR, Guatemala)	1	Mean annual deforestation rate (%)	1, 4 (community concessions)	3
106	Chowdhury R et al. 2006	Calakmul Biosphere Reserve	1	Land cover change (in km ²) and persistence (Percent of cover class in date 1 that transitioned (or not) in date 2)	1 (including within and around the Reserve comparisons), 2, 4 (<i>ejidos</i>)	3
107	De Clercq et al. 2007	Various - not stated	1	Mean change in spatial forest cover pattern (ha) and fragmentation	1, 3	2
108	Dressler WH et al. 2010	Puerto Princesa Subterranean River National Park	3	Behavioural change (Sweden farmers/ indigenous versus paddy farmers/migrants) under different governance regimes	1, 4, 5 (decentralization and devolved governance)	1
109	Gubbi S et al. 2008	Periyar Tiger Reserve	2	Attitudes towards conservation and towards PA (scores)	1 (incl.5 through Integrated Conservation and Development project)	Other: no intervention versus intervention
110	Hayes T. 2007	Río Plátano Biosphere Reserve (RPBR, Honduras) and Bosawas Biosphere Reserve (BBR, Nicaragua)	1, 2, 3	1) Ecological/ 2) behaviour: Agricultural expansion (encroachment activities) produced by mestizo migration (Land cover change for period 1995-2001 in ha); 3) Attitudes: attitudes towards the rules (% agree)	1 (RPBR), 4 (indigenous, BBR)	2

111	Hayes T et al. 2010	Río Plátano (Honduras), Bosawas (Nicaragua); Baga II, Baga I, Sagara (Tanzania)	1, 3	Conservation outcomes scores composed of: 1) ecological/2) behaviour: a) Mesoamerican case: deforestation trends (encroachment level), b) Tanzania: forest structure measures (basal area, stem density, and mean tree DBH), species composition, incidence of illegal logging	1, 4, 5	3 (Tanzania: not PA)
112	Johnson KA et al. 2004	Lagunas de Montebello National Park (LMNP)	1, 2	1) Ecological: vegetative cover type, regeneration (1/0), and pests (in <i>Pinus spp.</i>) (1/0), extent of groundcover, human activity, and indication and degree of burns (0-3); 2) Attitudes: relationship with external authorities	1, 4	2
113	Stokes EJJ et al. 2010	Nouabale-Ndoki National Park (NNNP), Lac Télé Community Reserve (LTCR) and some Forestry Management Units (FMUs)	1	Abundance of elephants (dung density (Dung piles/km ²) and individual density (Inds/km ²), gorillas and chimpanzees (nest density (Nests/km ²) and individual density (Inds/km ²))	1, 4 and joined state/private/NGO governance of forest management units	3

114	Kubo H et al. 2010	Gunung Halimun-Salak National Park	2, 3	1) Attitudes: perceptions, attitudes, trust and 2) Behaviour (stated, not measured) of both field staff and local people towards conservation and park (percentage of agree)	1 and "participatory" (educative and consultative participation)	1
115	Licona M et al. 2011	Biosphere Reserve composed of Bahuaja-Sonene National Park (core) with Tambopata National Reserve (core) and a buffer zone; Native Community of Infierno	1	Ungulate numbers (white-lipped peccary; collared peccary; lowland tapir; red brocket deer)	1, 4	3
116	Forrest JL et al. 2008	Madidi National Park (MNP), Madidi Integrated Management Area (MIMA), Tacana Indigenous Territory (TCO), forestry concessions	1	Rate of forest cover change over different management regimes (annual per cent change)	1, 2 (private concessions), 4 (indigenous),	3
117	Mehring M et al. 2011	Lore Lindu forest Biosphere Reserve	3	Perceptions of resource extraction (scale)	Other: 1 with community conservation agreements negotiated with the help of NGOs	1
118	Mena CF et al. 2006	Cuyabeno Wildlife Reserve (and adjacent Patrimonial forests)	1	Rate of forest cover change (ha, %)	1 and 4 (communities manage and have usufruct rights, land is under state ownership)	3 (PA versus patrimony (community) forest (outside))
119	Mgumia FH et al. 2003	8 Sacred groves (miombo woodlands):Mmeta I, Kalomo, Msago I, Mbeleka I, Ndisha, Mmeta II , Mbeleka II and Msago II and Uganda State Forest Reserve (USFR)	1	Stem density (1/ha), stem basal area (m ² /ha), species richness, Shannon-Wiener index, evenness, number of plant families,	1, 4 (sacred grove)	3

120	Monkkonen M et al. 2009	Various Voluntary Conservation Sites, Managed Forests, Private Forests	1	Biodiversity: dead wood (DBH, length), lichens and fungi	Other: Private: Voluntary Conservation Agreements (for compensation), private managed forests	Other: Private forest management with and without voluntary conservation programme (compensation based)
121	Mugisha AR et al. 2004	Protected areas with a community-based conservation approach: (1) Murchison Falls (MF), (2) Kibale, (3) Queen Elizabeth (QE), (4) Lake Mburo (LM), (5) Bwindi, (6) Mgahinga and (7) Mount Elgon (ME). PAs with a conventional management approach: (8) Karuma, (9) Bugungu, (10) Semuliki, (11) Kigezi, (12) Katonga, (13) Pian-Upe (PU), (14) Bokora, (15) Matheniko and (16) Kidepo Valley (KV).	1, 2, 3	Threat reduction assessment method/perceptions of conservation performance and outcomes,: 1) Ecological: deforestation; 2) Behaviour: illegal activities, 3) Attitudes: attitudes towards management staff and other practices (percentage agree, scales)	1, 4	2

122	Nagendra H 2002	Royal Chitwan National Park and other adjacent 2 locations	1	Measured: tree and sapling species richness, species diversity, density, DBH and height; Perceptions: vegetation density and of species diversity (perceptions of a forester, scale); Forest change: density of tree cover, shrub and bush cover, ground cover: (local people perceptions, scale)	1 (national park and national forests), 4 (community forests)	3
123	Nagendra H et al. 2004	Celaque National Park (CNP), Royal Chitawan NP (RCNP)	1	Rate of forest cover change (stable, regrowth, deforestation %) in the core, buffer and 5 km surrounding area.	Other: 1) State no participation, ejidos and private land owners inside park and 2) State with participation in the buffer zone (started in 1995) with state tenure	2
124	Nagendra H et al. 2008	Royal Chitwan National Park	1	Land cover change over time (% deforested, % regrowth, % degraded, %reforestation, % stable); forest fragmentation: Mean patch area (ha). Mean patch nearest neighbour distance (m), Mean patch shape index, Patch density (1/ha)	1, 4, 5 ((1) a national park; (2) a designated park buffer involving participatory forest management programs; (3) scattered patches of designated community forest; and (4) large areas of adjacent landscape made up of mostly private landholdings under agricultural practices.)	3

125	Nautiyal S et al. 2007	Nanda-Devi Biosphere Reserve and surrounding forests	1	Tree species inventory and forest structure: Density (1/ ha) and basal cover m ² /ha of tree, tree seedlings and shrub species), vegetation index values, temporal vegetation dynamics (%)	1 (GCF, PAF), 4 (TCF/Sacred forests, CCF),	3
126	Negroes N et al. 2011	Cantao State Park (CSP), Santa Fe Ranch(SFR)	1	Species richness/relative abundance index (mammal) and activity (mammals and birds)	1 (public PA), 2 (private forest fragment)	3
127	Nepstad D et al. 2006	Various - Brazilian Amazon	1	The ratio of deforestation (average annual deforestation rates from 1997 to 2000 within 10-km-wide strips of land located along the inside and out- side of the reserve perimeter) and fire inhibition (fire density (number of fires per square kilometre in 1998) within 20-km-wide strips along the inside and outside of the reserve perimeter).	1, 4 (indigenous)	3 (incl. inside - out)
128	Newton AC 2011	New Forest National Park	1	Biodiversity (number of large mammals), Declines and losses of different species group (descriptive)	1, 4	1

129	Oliveira PJ et al. 2007	Various national parks, indigenous territories, forest concessions (all names not stated)	1	Annual rates of forest damage extent and intensity -disturb and deforested (km ² /y),	1, 2 (concession production forests), 4 (Indigenous land and reserves for tribes in voluntary isolation),	3
130	Quintana J et al. 2005	Mbaracayu Natural Forest Reserve (private) (MNFR) and San Rafael Managed Resource Reserve(state) (SRMRR)	2, 3	1) Attitudes: relationships between the management bodies of the reserves and other stakeholders (descriptive), attitudes towards reserve (descriptive), 2) Behaviour: conflicts (descriptive)	1 (state as managers, private landowners), 3 (NGO as a management authority and landowner)	2
131	Rao BR et al. 2011	Sacred groves (Sadasivakona (SDK), Singirikona (SGK), Kailasakona (KLK), Bupathayyakona (BTK), and Talakona (TKN)) and Reserve forests (RF1-5) in Eastern Ghats	1	Species richness and density(count), basal area (cm), site disturbances: cut stumps, fire, grazing, lopping, invasive species (score)	1 (reserved forests), 4 (sacred groves)	3
132	Rueda X 2010	Calakmul Biosphere Reserve and other <i>ejidos</i>	1	Deforestation rate (km ²)	1, 4 (<i>ejidos</i> -communal agricultural land)	3
133	Sanchez-Azofeifa GA et al. 2009	Chamela-Cuixmala Biosphere Reserve and surrounding <i>ejidos</i>	1	Forest cover (difference) between CCBR and <i>ejidos</i> (%)	2, 4 (<i>ejidos</i>)	3
134	Stocks A et al. 2007	Bosawas Biosphere Reserve (BBR)	1	Spatial and temporal differences in forest cover (km ²)	2 (colonists), 4 (indigenous)	2

135	Thaworn R et al. 2010	Sri Nakarin Dam National Park (SNDNP), Chalerm Rattanakosin Forest Reserve (CRFR)	3	Change of behaviour: from various conflicts (resistance, encroaching) to collaboration (protection, voluntary conservation groups, fire watchers, etc.)	1, 5	2
136	Ting Z et al. 2012	Bai-shuijiang National Natural Reserve	3	Difference in dependency on forest resource: Firewood consumption, non-timber forest product value, livestock breeding (2006-2010), households' firewood consumption, livestock breeding (site comparison).	1, 5	1 (before-after: with and without community involvement through community-based co-management project)
137	Urquiza-Haas T et al. 2011	Sian Khan Biosphere reserve and other <i>ejidos</i> and private forests (El Zapotal Private Reserve; Tezoco Nuevo ejido; Yodzonot Laguna, Otoch Ma'ax Yetel Kooch protected area, Valladolid ejido; X-Conha ejido, forestry polygon 1, polygon designated for agricultural activities 2; Las Palmas private property; Sian Ka'an-Uaymil, Sian Ka'an Biosphere Reserve; Uaymil protected area; Uninhabited private properties; Tierra Negra ejido]	1, 3	1) Ecological: Encounter rates/abundance of mammal and bird species, 2) Behaviour: hunting pressure (perceptions and direct sighting of hunting tools -scale),	2, 3, 4 (<i>ejidos</i> /communal land-holding)	3

138	Van Gils H et al. 2006	Carrasco Ichilo National Park	1	Proportion (%) of converted closed forest (CCF) between 1986 and 2002 within each land tenure regime	1, 3, 4	2
139	Vuohelainen A J et al. 2012	Reserva Nacional Tambopata (RNT), Comunidad Nativa Infierno (CNI), Comunidad Nativa Palma Real (CNPR), Comunidad Nativa Boca Pariamanu (CNBR), Shihuahuaco (5), Picaflor Research Centre (PRC), Amarumayo (7), Reserva Ecologica Inkaterra (REI), Reserva Ecologica Taricaya (RET), and Reserva Ecologica Paraiso Amazonico (REPA).	1	Land use change/deforestation (ha/year, %)	1, 2,3, 4	2
140	Bodmer R et al. 2008	Pacaya-Samiria National Reserve	1	Increase in number of mammal species: 1997 (before co-management) and 2004; The per cent change in wildlife densities (%): 1996-2004	1 (state, before), 5 (co-management, after)	1
141	Ruiz-Pérez M et al 2005	Alto Jurua Extractive Reserve (AJER), National Park of Serra do Divisor (NPSD), indigenous lands	1	Land-use change: percentage of deforestation per year (%) (Fig.3)	1 (national park), 4 (community, trust, indigenous, extractive reserve) and a rural development project (INCRA)	3
142	Wallner A et al. 2007	UNESCO Biosphere Entlebuch (UBE) and the Carpathian Biosphere Reserve (CBR)	2	Perceptions of locals regarding two parks (descriptive)	1, 4 (local management board)	2

143	Baral N et al. 2007	Bardia National Park (BNP), Sukla Phanta Wildlife Reserve (SPWR)	2, 3	1) Attitudes towards conservation (percentage agrees), 2) Behaviour: Frequency of resources harvested (%)	1 incl. 5 (through user groups - with two different levels of participation/functionality of user groups and different levels of NGO influence)	2
144	Norgrove L et al. 2006	Mount Elgon National Park	3	"overt" and "covert" resistance to the park policies: mobilization of large groups/politicians, feigning ignorance, not turning up for meetings, letting roads become overgrown, bribing park staff and moving boundary markers under cover of darkness	1 incl. 5 (state law enforcement including participatory management)	1
145	Armenteras DG et al. 2013	Various in NW-AMAZON (names mostly not stated): National PAs and natural reserves, indigenous reserves, integrated-management districts	1	Fire occurrence and intensity (mean number of fires, fire radiative power per quadrant), differences in the edge effect (percentage of fires in each management type for 1 km distance bins both inside and outside the forest edge)	1 (national/state), 4 (indigenous)	3

146	Chowdhury M et al. 2014	Rema- Kalenga Wildlife Sanctuary	2, 3	1) Attitudes towards conservation, FD and co-management project (percentage agree, scale 1-5); 2) Behaviour: changes of occupation from day-labour and NTFP collection to agriculture	1 with 5 (through Integrated Conservation and Development project)	1
147	Holland MB et al. 2014	Various - not stated	1	Forest cover change (% by year)	1 (protected areas, forest reserves and patrimony forests), 2 (private/colonisation area), 4 (indigenous)	3
148	Mueller R et al. 2012	Various - not stated	1	Prevention potential of 3 causes of deforestation: small agriculture, cattle ranching or mechanised agriculture (modeling, logit)	1 (national parks, integrated management), 2 (forest concessions), 4 (indigenous territories)	3
149	Nolte C et al. 2013	Various - not stated	1	Gross Forest Cover Loss: 2000–2005 (%); 2005–2010 (%); Deforestation 2001–2005 (%) and 2006–2010 (%)	1, 4, sustainable use zones	3
150	Oldekop JA et al. 2013	Sumaco Biosphere Reserve and community forests	1, 3	1) Ecological: fern and leaf litter frog species richness; forest cover: NDVI, NIR, gap fraction; 2) Social: Establishing community reserves, monitoring and sanctions according to established rules (descriptive, scores- table 1).	1, 4 (community forests)	3

151	Osuri AM et al. 2014	Sacred groves in Kodagu, Karnataka	1	Species inventory (categorical: no forest, open/disturbed, closed canopy), trends in aboveground biomass (Trends in the ratio of Landsat ETM+ band 4 to band 5), changes in the extent of the sacred grove network (perception)	1 (state-managed forests), 4 (sacred groves)	3
152	Paneque-Galvez J et al. 2013	Beni Biological Station with indigenous territories, forest concessions and private lands	1	Trends (ha) and annual change rates, gain, losses and swap (%) in forest cover and trends in forest fragmentation (core-edge changes)	1, 2 (concessions), 4 (indigenous territories: Tsimane and multi-ethnic TCO inside state-owned PA (30%))	3
153	Pfaff A et al. 2014	Various in Acre (names not stated)	1	Deforestation trend (% after covariate matching) in two periods separately: 2000-2004 and 2004-2008	1, 4, integrated landscape	3 and unprotected versus protected
154	Scullion JJ et al. 2014	Various in Madre de Dios Area	1	Land-cover change (% ha), impacts of overlapping land use policies (% reduction in the ecosystem conversion)	1, 4 and 2 (no conservation)	3

155	Vallino 2014	NA (experimental/modelled study)	1	<p>Green patches, total biomass. Green patches = number of patches with biomass > 0 at the end of the simulation divided by the total number of patches that had biomass > 0 at the start of the simulation.</p> <p>Total biomass = sum of the biomass of each patch at the end of the simulation divided by the sum of the biomass of each patch at the start of the simulation.</p>	Other: open access, external law enforcement, internal rules	2
156	Vergara-Asenjo G et al. 2014	Various in Panama	1	(Mature) forest cover change (%) and avoided deforestation over different land tenures (% of treated pixel between 1992–2008 and 2000–2008, covariate matching)	1, 4 (indigenous/comarcas) and their combinations and overlaps totalling 6 tenure regimes): 1) legally established comarcas, no overlap with protected areas (C); (2) overlap between legally established comarcas and protected areas (C-Over); (3) claimed lands, no overlap with protected areas (Cl); (4) overlap between claimed lands and protected areas (Cl-Over); (5) nationally protected areas, no overlap with indigenous territories (PA); and (6) other lands, no protection (OL)	3

157	Vidal O et al. 2014	Monarch Butterfly Reserve	1	Forest cover change/deforestation and degradation (ha) by large and small scale logging and climate related (floods, strong winds, drought, and fire)	1, 2, 4 (<i>ejidos</i>)	2
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MAPPING THE QUALITY OF THE STUDIES RELEVANT TO THE QUESTION

a. Study design

Twelve studies were classified as a case study. One study was described as a comparative case synthesis (Hayes & Persha 2010) and one as an simulated experiment (Vallino 2014). Twenty studies could be categorised as time series with the site comparison. Three studies were designed as “before-after” (Bajracharya et al. 2005; Bodmer et al. 2008; Chowdhury et al. 2014). Fifteen studies had cross-sectional study design (site comparison in one time point). One study was designed as control-impact (Gubbi et al. 2009). Only four studies had before/after/control/impact (BACI) design (Ting et al. 2012; Nolte et al. 2013; Pfaff et al. 2014; Vergara-Asenjo & Potvin 2014). Study design details are in Figure 2.2.7.

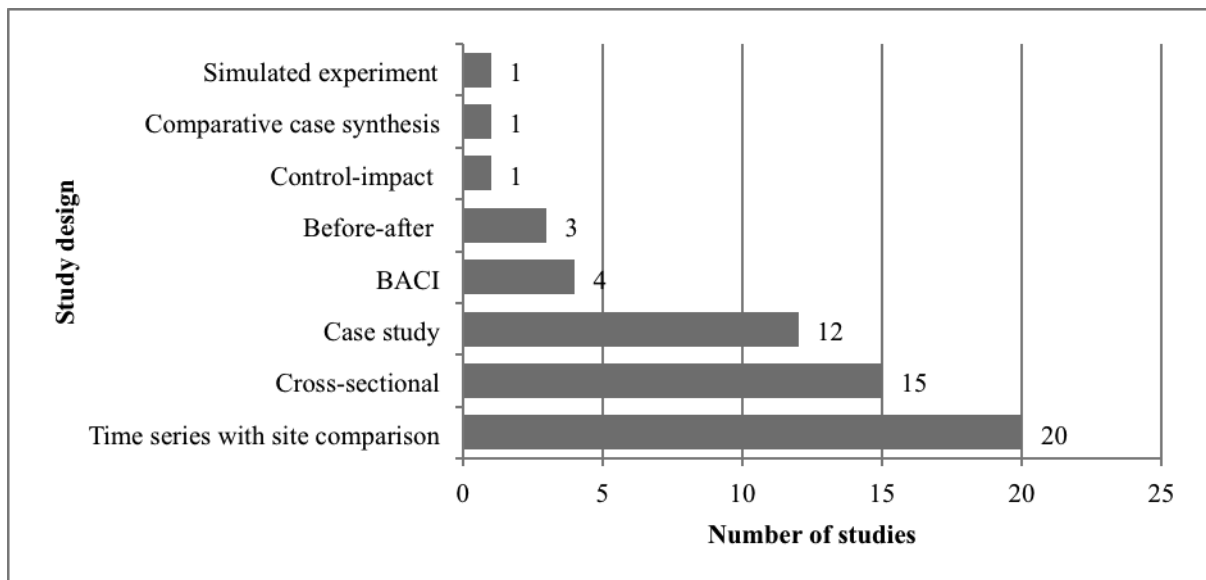


FIGURE 2.2.7 STUDY DESIGN IN THE INCLUDED STUDIES (N=57)

b. Appropriateness of comparator

Out of 48 observational and quasi-experimental quantitative and mix-method studies, 39 (81.25%) had no baseline data at all and they were either simple site comparisons or time-series (Figure 2.2.8). Four studies (8.33%) had baseline collected thorough recall and people’s perceptions (Nagendra 2002; Norgrove & Hulme 2006; Kubo & Supriyanto 2010; Chowdhury et al. 2014). One study had simple before-after

comparator in a single PA (Bodmer et al. 2008). Only four (8.33%) studies had appropriate comparator, used matching methods to create counterfactual and control for observational bias (Ting et al. 2012; Nolte et al. 2013; Pfaff et al. 2014; Vergara-Asenjo & Potvin 2014)

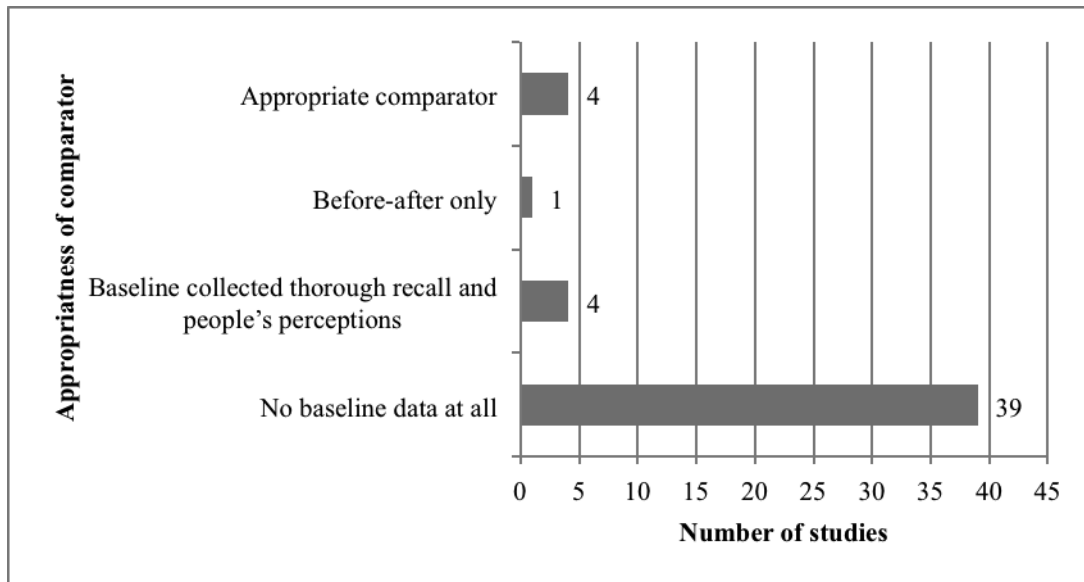


FIGURE 2.2.8 APPROPRIATENESS OF COMPARATOR IN INCLUDED QUANTITATIVE AND MIXED-METHODS OBSERVATIONAL AND QUASI-EXPERIMENTAL STUDIES (N=48)

c. Level of methodological details

Most of the studies (47) had medium level of methodological detail with sufficient details on data collection and analysis procedures, and justified selection of methods. Nevertheless, most of the studies lacked explanation of study limitations and have not commented upon potential biases in data collection, analysis or reporting. Three included studies had low level and seven studies had high level of methodological detail.

d. Objectivity of measurements

Out of 46 studies reporting ecological outcomes, 38 studies used objective measurements of ecological outcomes, 4 studies used subjective measurements to report ecological outcomes (self-reported, observation or perception –based). Three more studies used mixed subjective and objective measurements to report different ecological outcomes. One study simulates the outcomes through agent-based modelling.

MAPPING LIMITATIONS

1) Crossing qual-quant divide

This evidence map is biased towards quantitative data. This is mainly because the research question was leaning towards this type of the evidence.

Available qualitative studies were mostly in-depth case studies, mostly describing various forms of park-people conflicts, predominantly on the state-community power continuum. Most of these studies could not fit to the inclusion criteria as they were focusing solely on the governance or institutional processes and without reporting required outcomes.

On the other hand, quantitative studies frequently lack explanation of contextual variables that can be important for more complete understanding of the local-level PA effects.

2) Mapping complex interventions

Collating evidence on complex interventions with many interrelated and independent components might be a challenge, especially when it comes to common definitions, categorization and finally synthesis. Depending on the national conservation governance arrangement, some PAs had multiple and overlapping institutional arrangements and governance styles within a single PA. For example studies by Baral and colleagues (Baral & Stern 2010; Baral et al. 2010) describe the case of Annapurna Conservation Area in Nepal, where PA land is owned by the state, management is given to NGO/trust, and there are local community committees. Similarly, In Mexico, mapped studies focus on effects of different tenure regimes within and around PAs (e.g. state PAs with *ejidos* (communal lands)) on the state of the biodiversity or land use change (e.g. Cortina-Villar et al. 2012). In other cases in Central and South America, studies

overlap between indigenous territories and state-owned PAs. Typically, PAs entail zones with different levels of strictness and resource access by local communities (for example between core and the buffer zones), which also might have different effects on relevant outcomes.

In some examples authors mention “governance”, but they seem to refer to the management categories or the level of strictness and resource access (e.g. Pfaff et al. 2014).

There was insufficient information on type of the actors involved in PA governance, their responsibilities, governing rules and level of power sharing to understand the governance mode in the study according to our definition (241/29.5% studies were excluded at full-text screening stage for this reason).

These examples reflect complex realities on the ground and point to difficulties in isolating and assessing conservation governance effects, but also to challenges in collating evidence with such heterogeneity and without common (governance) definitions.

3) Risk of evidence omission

We included studies that assess effect of PAs relative to community or private concessions. However, we might have failed to include studies that focus on the community or private forestry, but had PA as a comparator. This might have happened at the initial levels of evidence screening (at title and abstract) as comparator is less explicit in the title or abstract. Consultation with the stakeholders and experts while conducting full systematic review can help in mitigating this bias.

Moreover, some important evidence might have been missed through exclusion of the non-English literature (20). Accuracy of the map (and of potential evidence synthesis) could have been higher with this type of evidence.

LIMITATIONS IN THE EVIDENCE BASE ON THE GOVERNANCE ROLE IN CONSERVATION EFFECTIVENESS

1) Acknowledging and reporting the role of governance

Majority of screened full-text articles (93%) did not have all the necessary pieces of evidence to be included in the map.

It was not possible to code in detail different governance styles and map information on nature of participation, level of decentralization, number of actors and their responsibilities, which would allow for testing our hypotheses from the Protocol (see (Macura et al. 2013)).

There are two reasons for this. Studies that described institution and governance system in detail were lacking sufficient details on relevant outcomes and were rejected (e.g. Chandrakanth et al 2004) (175 or 21.4% studies were excluded with this reason). These kinds of studies frequently focus on intermediate variables such as level of participation, but without robust measures of conservation policy outcomes which is also noted in literature on decentralization in forestry (see:(Andersson & Gibson 2007)).

In other cases, when research entailed relevant outcomes (e.g. forest cover change or biodiversity assessment), there was no (or insufficient) information on the governance arrangements.

However, the studies lacking information on governance might not be aiming and were not possibly designed to evaluate role of the governance in conservation effectiveness.

Studies mostly include state and community (including both informal and formal) forests and PAs but they focus less on the private and co-managed forests and PAs (Figure 2.2.5).

2) Reported outcome types

Majority of the articles focused on only one, specifically ecological, type of outcome (e.g. land cover change studies that focus on deforestation rate only). Nevertheless, conclusions of these kinds of studies on PA effectiveness can give incomplete or biased picture as PAs are deeply embedded in social, economical and political spheres of society as well (Brechin et al. 2010)

Moreover, we could not locate a study that addresses spill-over effects or policy side effect in connection to the PA governance. These kinds of studies would be beneficial for comprehensive understanding of the conservation governance effects in on the bigger scales. Our definition of the spill-over outcome was too vague. Moreover, measurement of spill-over effects require baseline data which is frequently missing or hard to obtain in the PA-related research as majority of conservation interventions were never designed to be evaluated (Ferraro & Pattanayak 2006)

3) Study Designs, comparator and attribution problem

Frequently, studies had information on outcomes and governance, but have not had comparison against which a specific governance arrangement could be evaluated (144/17.6% studies were excluded at full text stage with this reason).

The majority of included studies (52.6%) compare PAs to adjacent forests outside of PAs but this cannot tell us anything about relative effectiveness of different PA governance modes.

Attribution, isolating and accurately estimating effect of intervention and assuring flow of causality from intervention to the outcome, is one of the central questions in the evaluation (Leeuw & Vaessen 2009). Majority of the included studies have not had baseline data. This is perhaps because conservation programmes and policies were never designed to be evaluated (Ferraro & Pattanayak 2006). Similar to observations in other relevant reviews (Geldmann et al. 2013; Pullin et al. 2013), in this map only small number (4) of included studies had appropriate comparator and BACI design that could

control for spatial and time-variant bias and attribute effects of intervention to the actual outcomes and not to some other modifiers. Time-series or spatial comparison designs can attribute effects to the intervention only if there are no other factors explaining the change in effects or when only intervention influence ground conditions- which is in complex conservation scenario almost impossible.

Moreover, studies rarely exclude alternative scenarios that might have influenced measured outcomes, or do not use qualitative data to build and support causal reasoning and make theories of change (Baylis et al. 2015). Counterfactual thinking or “what would have happened if there had been no intervention?” crucial for answering effectiveness questions is yet to be mainstreamed in conservation programme and policy evaluations (Ferraro & Pattanayak 2006; Ferraro 2009; Miteva et al. 2012; Ferraro & Hanauer 2014; Baylis et al. 2015)

4) Geographical spread of research

Research located in northern parts of North America (USA, Canada), in Australia, north and west Asia, were not captured by this map at all, while Europe and Africa are covered but only in a small extent.

Conclusions

The results call attention to the research gaps in the field of natural resource and conservation governance and provide input for future evidence synthesis.

IMPLICATIONS FOR PRACTICE AND POLICY

Here we give an overview of the state of the evidence base in terms of the quantity and quality of studies captured in the review.

As in other examples of systematic reviews in conservation (Pullin et al. 2013) and decentralization and community forest management (Bowler et al. 2010; Samii et al.

2014), evidence base in this map is small, in the sense of size, quality and geographical spread, and without enough explanatory power to answer the specific effectiveness questions.

Most of the studies do not exclude alternative explanations or control for non-random assignment of conservation interventions. Instead, they apply simple site comparisons or use time-series when comparing different governance regimes, very rarely using regression or matching methods, do not control for selection bias or exclude alternative explanation. Recent calls for more rigid evaluations and methodological breakthroughs in conservation evaluation methods adapted from impact assessment (Baylis et al. 2015) should help to strengthen the evidence base on the role of governance in the conservation effectiveness of forest PAs.

IMPLICATIONS FOR SYNTHESIS

The research question of this map could be broken into smaller parts and each governance type could be assessed separately to better understand the magnitude of effects of one specific governance arrangement over the other in PAs or outside, with community forests, depending on the country context. With this map as a start, the synthesis should not be too time- or resource –consuming. Full data extraction, full critical appraisal and quantitative or qualitative synthesis should be added. Before start such exercise, this map should be updated with the new evidence.

While conducting evidence synthesis, reviewers need to be careful when extracting and synthesizing data from different counterfactual scenarios. Namely, one cannot compare outcomes obtained from comparison between state PA and community forests with the comparisons between state PAs and no intervention. These are two different counterfactuals and if not clearly separated, these comparisons would give a wrong picture of intervention effects to policy makers (thanks to P. Ferraro for clarifying this point during review of the protocol)

Finally, reviewers have to acknowledge complexity, develop common broader definitions, provide context through qualitative data and policy documents, develop theories underpinning complex governance interventions and be transparent at all stages of the review (especially about lack of consensus) in order to capture evidence. Lessons can be learned from attempts to provide guidance on evidence synthesis of complex interventions in medicine (Shepherd et al. 2009).

IMPLICATIONS FOR RESEARCH

Based on our observations of the methodological rigour of current research we provide the following summary of shortcomings of the current evidence base in terms of knowledge gaps and the need for primary research:

1. While conducting analysis of intervention effects in complex socio-ecological systems such as PAs, research has to take into account local context and governance modes that might modify effect of the intervention. Therefore it is necessary to have more PA effectiveness studies with more detailed governance information, specifically how decisions are made and implanted, the role of different actors and their responsibilities and accountability. The role of governance in PAs effectiveness should be assessed relative to local dynamics (see (Dressler et al. 2006)) and researchers have to develop in-depth understanding of institutional, contextual and historical diversity to be able to conduct more rigorous analysis and decompose governance processes into elements that can be more easily analysed (see for example multilevel, nested framework for analysing outcomes achieved in socio-ecological systems (Ostrom 2007)).
2. More reliable study designs that rely on causality, include baseline data, and exclude alternative scenarios are necessary. There is a need for better and more rigorous study designs and collection of baseline data. Research designs with appropriate choice of comparator and elimination of alternative explanations have to be prioritized to isolate effects of governance modes in the complex ground realities.

This is especially applicable for land use change studies where satellite images only cannot tell the story of the PA effects without in-depth studies of local institutions as well as national political context. If this is not possible, researchers have to understand and acknowledge these limitations.

3. Higher level of methodological explanation and more details in the reporting of the research is needed to enable appraisal of reliability.
4. Incorporating measures of both social and ecological outcomes will give a more nuanced and complete picture of different PA effects, acknowledging synergies and trade-offs in conservation (Hirsch 2010).
5. Large-n comparative studies that can show lessons from different countries and continents within similar (economical, ecological or social) contexts including sufficiently detailed information on local governance, institutions and actors are necessary.
6. Small and localised studies on governance processes that include rigorous outcomes are needed to fill the evidence gaps.
7. Longer- term studies with good baseline information are needed.
8. Collaborative research teams to capture complexity of social-ecological systems such as forest PAs, looking at institutions as well as social and ecological outcomes of PAs when comparing governance arrangements would be welcome. Forestry Resources and Institutions (IFRI) methodology and research (<http://www.umich.edu/~ifri>) is a good example of this point.
9. As in review by Bowler and colleagues (Bowler et al. 2010), we would recommend standard outcome measures of various conservation success to be able to compare between the studies.
10. Stronger evidence is needed on the effectiveness of private or co-managed PAs in comparison to other PA governance types
11. Research on spill-over effects of forest PAs conditional on their governance type is necessary to have a more holistic picture of complex linkages between social and human systems

Here we attempt to generate research questions that to fill in current research gap:

- What are the effects of private protected areas on social and ecological outcomes when compared to other types of protected areas?
- What are the effects of co-managed protected areas on social and ecological outcomes when compared to other types of protected areas?
- Which governance modes (state, private, community or co-managed) might cause comparatively higher spill-over effects in the context of forest protected areas?

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CHAPTER 3

POTENTIAL FOR SOCIAL CONNECTIVITY IN LANDSCAPE-SCALE TIGER CONSERVATION OF CENTRAL INDIA

Introduction

Protected areas (PAs) are not managed in vacuum (DeFries et al. 2010). They are embedded in wider landscapes, include people, institutions and revolve around global and local politics (Brechtin et al. 2002; Kashwan 2013). In human-dominated landscapes, biodiversity conservation often competes with human livelihoods, agriculture or industrial development. Sectoral approaches to reconcile these competing needs are predominant, but are recognised as inadequate (Sayer 2009). Landscape-scale thinking and establishment of social “synapses” across sectoral boundaries are argued to increase landscape multi-functionality necessary for aligning interests of conservation with other societal needs (Sayer et al. 2013).

Landscape-scale conservation is grounded in the prescriptions of landscape and restoration ecology and conservation biology (Lindenmayer et al. 2008) mostly through creation of strong connectivity or “corridors” between individual PAs. This approach has been especially applicable in conservation of wide-ranging large carnivores, such as tigers, whose survival depend on the availability and size of the expansive habitat and cannot be constrained within a single isolated PAs or within jurisdictional boundaries (Yumnam et al. 2014). However, prioritization of ecological connectivity is complemented by more holistic understanding of landscapes as arenas of complex interactions among humans and their environments (Vaccaro & Norman 2008; Sayer et al. 2013). In tropical human-dominated landscapes, forested areas are embedded in diverse social and cultural local contexts (DeFries et al. 2010). PAs and their corridors may be understood as embedded elements in wider social-ecological systems (SES), which are complex, non-linear, interconnected and unpredictable (Folke et al. 2005). Scientists acknowledge that this complexity cannot be successfully managed without

collaboration of local people, multiple agencies, state and non-state actors that shape, work and live in those landscapes (Nagendra & Ostrom 2012).

Proponents of a landscape approach have outlined major challenges of a shift from sectoral approaches to aligning “social and ecological connectivity” and cross-sectoral collaboration (Kininmonth & Bergsten 2015). The main push of landscape-scale approaches is for a shift from “ecosystem networks that are disconnected and fragmented by the actions of people” to “ecosystems that are connected by people through flows of information or materials” (Janssen et al. 2006). A shift can be helped along by intensifying collaborative interactions among actors: trust building, higher information flows and knowledge sharing to help consensus building (Heikkila & Gerlak 2005; Bryson et al. 2006; Ansell & Gash 2008; Brondizio et al. 2009; Wyborn & Bixler 2013). Sayer et al (2013) further underlined importance of negotiated and transparent change logic with clarification of rights and responsibilities among actors for successful landscape approaches.

A shift to a landscape-scale approach involves collaboration among different agencies in the landscape as well as greater support of forest dwellers dependent on the forest corridors for their livelihoods. Thus, working on the landscape scale requires conservation practitioners to use different skills from the ones traditionally deployed in PA-centric approaches (Sayer 2009). Change must be accompanied by cognitive shifts from silo to systemic thinking (Sterling et al. 2010; Waylen et al. 2015). Managers, along with the other actors in the landscape, are encouraged to develop patience, flexibility, humility and be open to change (Wyborn 2012). Finally, landscape scale conservation has to be supported by a dynamic institutional context that can foster inclusive collaborative and nested governance systems (Wyborn & Bixler 2013). Thus, comprehensive understanding of the change towards landscape level conservation does not only need knowledge of ecological landscape functions and structure, but also a comprehensive analysis of existing social and institutional structures, historical and political drivers, relations of power and trust among landscape actors (Vaccaro & Norman 2008)

Recent studies have proposed greater landscape connectivity for tiger survival in India and in other tiger range countries (Linkie et al. 2006; Rathore et al. 2012; Joshi et al.

2013; Sharma et al. 2013; Yumnam et al. 2014; Gubbi et al. 2015). With few exceptions (e.g. (Gubbi et al. 2015)), these studies do not consider what ecological connectivity at the landscape level might mean in social, institutional or political terms.

In this study, we analyse the shift to a landscape conservation approach, broadly using the case of central Indian Tiger reserves. Given changes in discourses and policy in India towards a more integrated management approach, we ask whether, and to what extent, conservation actors in central India are prepared for the shift towards landscape-level conservation. In particular, we analyse which institutional, historical and organisational factors could enable or constrain this shift. Tiger conservation has historically been perceived to be a function of the state forest departments (FD). With new challenges of creating landscapes conducive to large carnivore conservation, our main concern is which challenges this main actor will have to experience with rise of the new landscape conservation paradigm. We are further interested in interaction between FD and local forest dwellers who rely on forest corridors for their livelihoods and have been caught in between larger conservation and development concerns through shift to landscape thinking.

India is one of the 13 tiger-range countries, with the highest human population density and comparatively lowest forest cover, yet with the highest number of tigers in wild (2226 at present (Jhala et al. 2015)).

Tiger conservation is an ideal example of current conservation challenges, especially in the context of developing tropical countries. Tiger conservation has a global conservation priority, which is spurred by a high potential for complete extinction due to vanishing habitats, small prey base and extensive poaching. There is also a high potential for private gain from tiger conservation (for example from tourism) and rights and survival of millions of forest-dependent people are at stake (Rastogi et al. 2012).

We focus our analysis on actors around Melghat, Pench and Tadoba-Andhari TRs in Maharashtra and Pench and Kanha TRs in Madhya Pradesh. These TRs located in the central Indian highlands are one of the best-managed reserves in India (according to the latest management evaluation exercise (NTCA 2015a)). They are interconnected with forest corridors used by tigers in variable extents (Sharma et al. 2013). **Figure 3.1**

shows location of these reserves located in the heart of recently designated Central Indian & Eastern Ghat Landscape complex (Jhala et al. 2011). Area of central Indian highlands represents itself a suitable case study. This area has been studied by other scholars recently (Jhala et al. 2007; Sharma et al. 2013; Yumnam et al. 2014). Moreover, WWF-India has proclaimed it as one of the critical conservation regions for tigers in India (WWF-India 2015a, 2015b). Yet so far, researchers and conservationists have not focused on the institutional aspects of landscape-scale conservation.

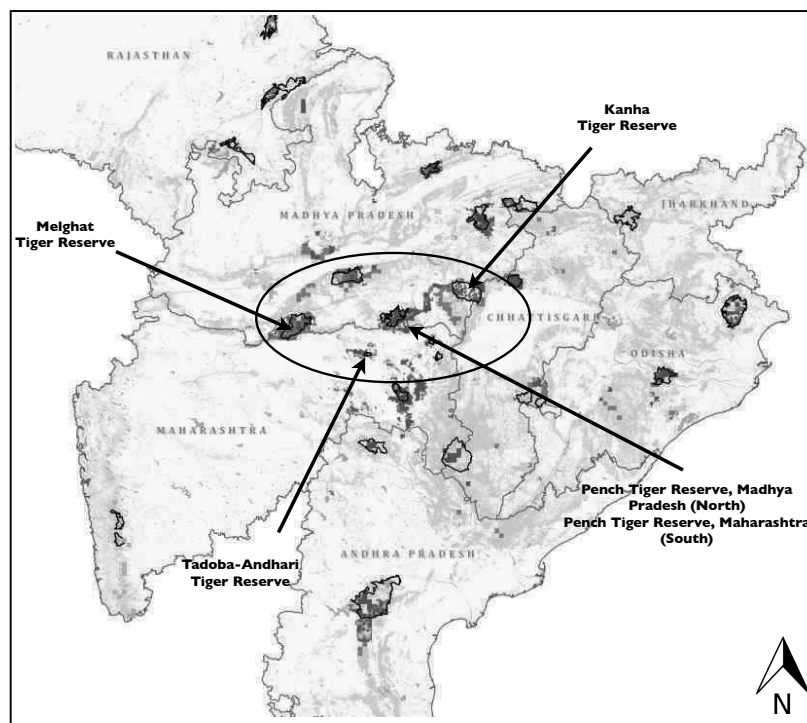


FIGURE 3.1 CENTRAL INDIAN & EASTERN GHAT LANDSCAPE COMPLEX WITH MELGHAT, PENCH AND TADоба-ANDHARI TRS, MAHARASHTRA AND PENCH AND KANHA TRS, MADHYA PRADESH. BLACK LINES ARE BOARDERS OF TRS AND OTHER PAS. DIFFERENT SHADES OF RED DOTS REPRESENT TIGER DENSITY GRADIENT IN OCCUPIED HABITAT (HIGHER DENSITY =DARKER SHADE). STRONG CONNECTIVITY BETWEEN PENCH AND KANHA TRS IS VISIBLE. FIGURE SOURCE: JHALA ET AL. (2015)

Previous studies give only partial answers to our research questions since they mainly focus on collaborative forest governance, but without direct reference to wildlife conservation. Kumar and Kant (2005, 2006) study factors of organisational resistance to

Joint Forest Management (JFM). Matta et al (2005) and Sood and Gupta (2007) have similar focus. Another downside of former studies is that most of them only account for the perspective of FD, while views of external actors such as scientists or NGOs are not included. Moreover, these authors focus only on constraints to collaboration, but do not suggest what can enable collaboration. For example, Ebrahim (2004) compares JFM and irrigation policy through an account of institutional preconditions to collaboration, but no organisational issues are accounted for. Fleischman (2012) analyses behaviour and organisational structure of FD to understand why implementation of policies fail, but like previous authors, he focuses on the forestry sector and JFM only.

We use data generated from interviews with a range of actors in Indian tiger conservation and report perceptions of different state and non-state actors with regards to 1) political context and institutional structure in which interactions between FD and other landscape actors are imbedded; 2) internal organisation of the managing agency (FD) that might influence collaboration; and 3) the nature of relationships among FD and other actors and how these interactions affect the collaboration on landscape-scale conservation efforts. Here we give only a preliminary analysis of the governance and its potential for a change as this is on-going research.

Methodology

We employed a combination of purposeful and snow-ball sampling to select interviewees. First, we identified a main list of interviewees connected to central Indian tiger conservation, including NGOs, consultants, policy makers, scientists and representatives of the state forest departments (purposeful sampling). After interviews were conducted, we asked interviewee for contacts of other relevant actors in order to locate actors that are not easily reachable through official websites or documents (e.g. local NGOs), to understand networks and map main players in tiger conservation of central India (snow-ball sampling). The list of the interviewees was iteratively updated based on the increasing knowledge of the actors and emerging concepts from the interviews. A total of 29 interviews with the key informants were then conducted between April and June, 2013. Interviews are listed in **Table 3.1**. Participants were fully informed about the nature and the scope of the study, aims, methods and the uses of the

data to be collected. Informed voluntary consent was sought prior to the interview. Confidentiality is respected and interviewee names are kept anonymous. Participant Information Sheet and the Consent Form used for this research are provided in **Annexes 10 and 11**.

Interviews were structured in different thematic sub-sections in order to understand tiger reserve conservation governance, management practices, institutions, policy frameworks, and perception of governance and conservation history. All interviews were conducted in English in the states of Maharashtra: in Pune and Nagpur; in New Delhi and at the Wildlife Institute of India, Dehradun. Additionally, five tiger reserves were visited in Maharashtra (Pench, Tadoba-Andhari, Melghat) in June 2013 and in Madhya Pradesh (Kanha and Pench) in the period January to May 2014.

All the interviews were fully transcribed and transcripts of interviews were coded using RQDA software (Ronggui 2010). Our analysis was guided by a grounded theory approach (Glaser & Strauss 1967). We applied open coding, followed by axial coding reflecting relationships discovered in interview content.

TABLE 3.1 OVERVIEW OF INTERVIEWED ACTORS, THEIR ROLE IN THE LANDSCAPE AND ADMINISTRATIVE LEVEL OF ACTIVITIES.

Interviewees (29)	Level of activity
NGOs = 5 (17.8%)	Federal, State and Local
Experts = 5 (14.3%): Consultant (3), Environmental lawyer (1), University professor/consultant (1)	Federal and State
State Forest Departments and Indian Forest Service = 9 (32.1%)	State (Maharashtra and Madhya Pradesh) (7) and local TR-level (2)
Policy makers = 2 (7.1%) Ministry of Environment, Forests and Climate Change, National Tiger Conservation Authority	Federal
Scientists = 8 (28.6%) (Wildlife (6) and Social (2))	Federal/National

Case Study

Tiger conservation in India cannot be considered separately from forest management history, including the legacies of colonial forestry and the struggle of forest dwellers' over forest rights and access to forests. In this section we consider the legacy of tiger conservation approaches, and the predominance of “fortress conservation” implemented through the actions of the FD, even after favourable participatory conservation and development policies were enacted.

Approaches to tiger conservation adopted by the FD have been criticized as exclusionary conservation, governed by a distant central authority without participation of local people (Rastogi et al. 2012). Based on the scientific argument that tigers need large human-free areas to survive and reproduce, the exclusionary approach was favoured in core zones of state tiger reserves (TRs), which were to remain free from human settlement and harvesting activities. Significantly, this policy has been operationalized in part through the voluntary relocations of villages in reserve core areas while TRs remained open to research and tourism.

National Tiger Conservation Authority (NTCA) is the main governing body for Project Tiger, a tiger conservation programme launched in 1974 as a centrally sponsored scheme by the Prime Minister Indira Gandhi. NTCA, a statutory body of Ministry of Environment, Forests and Climate Change (MOEF&CC) provides a supervisory and coordinating role for tiger conservation implemented through the wildlife wings of state forest departments in 18 tiger states, and an expanding network of TRs (48 at present). The 1972 Wildlife Protection Act (WPA) is the main legal tool for establishing protected areas under which the central government may declare an area a national park or a wildlife sanctuary. This act facilitated an increase in the Indian PA network, including the tiger reserve system. However, the WPA with its two Amendments (2002 and 2006), must be interpreted simultaneously with the 1927 Indian Forests Act, the 1980 Forest Conservation Act, the 1986 Environment Protection Act, the 2002-2016 National Wildlife Action Plan and the 1988 National Forest Policy that together form the legal grounding for forest and wildlife conservation in India (TERI 2015). Although enacted during colonial rule, the 1927 Indian Forests Act forms the basis for modern forestry and conservation in India, including the “establishment and demarcation of

forest boundaries, trespass, cutting and control of movement of forest products” (Springate-Baginski & Blaikie, 2007). It also consolidates the power of forest officials for regulation of the use of public lands (Ebrahim 2004). The 1980 Forest Conservation Act does not allow for conversion of forests to non-forest land cover and so increases the power of the central government over forest resources. The 1986 Environment Protection Act gives central government the power to restrict operation and establishment of industries harmful for the environment. It can serve as an instrument for protection of the corridors and forests outside of the protected areas through the declaration of eco-sensitive zones (that must be declared within a 10km radius around a protected area) to restrict industrial activity (TERI 2015). Policy change is being driven by a variety of actors. The Supreme Court of India has a significant role in governance of forests and wildlife, giving more power to the centre and curtailing rights of the state governments when needed (TERI, 2015).

The state FDs, as implementing agency of MOEF&CC, were founded during British rule in 1865. British colonial rulers established centralised forest management with scientific forestry, and also created the hierarchical organizational structure of the FD (Kumar & Kant 2006). Despite of changing roles of the FD through its history, there has been an insignificant change of FD organizational structure from colonial times to the present (Kumar & Kant 2005).

The FD has a territorial wing with a mandate of forest management and timber extraction, and a wildlife wing with the primary aim of forest and biodiversity conservation. The Indian Forest Service (IFS) (established during colonial times as the Imperial Forest Service) is one of three civil services in India today, recruited and trained (for two years) by the central government (IFS 2012). Two thirds of all the top posts in a state FD are filled by the central level IFS officers. State level cadre takes one third of the top state level positions on the promotion basis (Fleischman 2012).

Higher-level forest officials include a state FD head - Principal Chief Conservator of Forests, below which is the Chief Conservator of Forests, Conservator of Forests and finally, Divisional Forest Officers (operational at a district level). In TRs, at the top is a Field director, under whose responsibility are Additional Conservators of Forest, below which are Divisional Forest Officers (responsible for a division). Lower level or “front-

line” staff are: Range forest officer or Ranger (responsible for a range), Deputy rangers, Foresters ¹⁰or Round Forest Officer (responsible for a round) and finally, beat guards (responsible for beat – the smallest administrative unit further composed of the smallest forest units called compartments). Every beat guard usually has one or two temporary workers at his disposal. Temporary workers come from the local villagers.

The higher level officers and TR administration are placed in the urban centres (e.g. Mumbai and Nagpur for Maharashtra Forest Department), while lower level staff is located directly in the TRs. Between higher level officers and lower level FD staff, there are frequently large gaps not only in the spatial terms, but also in the social status driven by elitism, differences in education, experience, language and background (Sood & Gupta 2007). The main legislation and historical turning points are listed in the **Table 3.2**.

TABLE 3.2 EVOLUTION OF FORESTRY AND CONSERVATION POLICIES (AT THE FEDERAL LEVEL) AND TURNING POINTS. PHASES ARE DENOTED ACCORDING TO PATNAIK (2007) SOURCES: (GUHA 1983; GUHA & GADGIL 1989; GADGIL & GUHA 1992; MENON 2007; PATNAIK 2007)

Pre-colonial rule		Decentralised indigenous forest management
Colonial rule 1800-1947	1806	Royalty rights over teak in Malabar and East India Company
	1865	Forest Department
	1865 and 1878	Indian Forest Acts Claims over the forests, restriction of the old customary rights, forests classified as Reserved and Protected
	1927	Indian Forest Act Forests demarcated into Reserved, Protected and Village. Basis for the state forest management today.
	1947	Independence
I phase: Revenue maximisation	1952	National Forest Policy Main goal: forest revenue maximisation.

¹⁰ I use “Forester” here to denote rank of a forest officer, whereas “forester” refers to FD staff in general, regardless of ranking

and industrial development		
II phase: Exclusive, strict conservation of resources	1972	Wildlife Protection Act Government has a right to declare any area as a wildlife sanctuary or national park. Basis for wildlife conservation today. Strict exclusionary policy
	1980	Forest Conservation Act Stops diversion of forest land for non-forestry purposes Reduction to de-reserve a forest and to divert of the forests for non-forestry purposes
	1986	Environment (protection) Act Not directly connected to the conservation of biodiversity within protected areas, but might serve as an instrument for protection of the corridors and forest outside of the protected areas, that are connecting Tiger reserves in the landscape - through establishment of eco-sensitive zones
III phase: People approach	1988	The National Forest Policy People's involvement in the development and protection of forests. Inclusions never fully applied
	1996	Panchayats (Extension to Scheduled Areas) Act (PESA) Gram Sabhas entitled to self-govern their resources (cultural identity, community resources, etc.) in the Scheduled areas ¹¹
	2002	Biological diversity Act: The National Biodiversity Authority established in 2003 to implement the provisions under the Act. State Biodiversity Boards created along with Biological management committees (for each local body).
	2003	Wild Life Protection Act, Amendment: A new category of protected areas, Community Reserves included
	2004 and	Local tiger extinctions: 2004 in Sariska TR, 2005 in Panna TR. Sariska triggered many policy and practice changes including

¹¹ V and VI Schedule of the constitutions refer to the areas and tribal communities in need of the special protection due to disadvantaged conditions

	2005	creation of Tiger Task Force, followed by Amendment of the Wildlife Act, scientific monitoring (camera traps), NTCA creation, call for more local people inclusion
	2005 - 2006	First Management Effectiveness Evaluation of Tiger Reserves (after that conducted every 4 years)
	2005	Mahatma Gandhi National Rural Employment Guarantee Act: 100 days of guaranteed wage employment to every household in rural India and enhances livelihood security (sometimes rural population employed in Tiger reserves)
	2005	Right to Information Act: Request information from a public authority with a reply within 30 days. Every public authority required to computerise records for wide dissemination and to pro-actively publish information
	2006	The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act: Traditional rights (to land) asserted to the tribal population and other forest dwellers. This rectifies historical injustice towards marginalized forest dependent people
	2006	Wild Life Protection Act, Amendment: Statutory status to the National Tiger Conservation Authority and the Tiger and Other Endangered Species Crime Control Bureau (Wildlife Crime Control Bureau) . This is done upon recommendation of Tiger Task Force from 2005, after Sariska Tiger Reserve lost all its tigers.
	2008	Forest Right Act Rules Notification
	2013	Tourism ban: tourism in the core zones of tiger reserves banned and subsequently allowed again but with the controlling access. After this event NTCA released the guidelines on tourism regulation in tiger reserves, decreasing the number of vehicles and restricting the areas for tourism

More recently, however, an inclusive conservation agenda has been pursued in the inhabited buffer zones and corridors of TRs (NTCA 2015b). In contrast to 1952 Forest

Policy, which had the main purpose of maximising forest revenue, the 1988 National Forest Policy adopted a conservation-oriented tone. This policy was the first to call for greater participation, decentralized and livelihoods oriented natural resource management (Patnaik 2007; Véron & Fehr 2011). In forests outside PAs and TRs, this was translated on the ground through implementation of co-management programme referred as Joint Forest Management (JFM). The first co-management initiatives originated in 1970s in West Bengal (Balooni 2002) and these successful practices were translated into the Government of India JFM guidelines issued to all states in 1990.

In the buffer zones of the PAs and TRs, integrated conservation and development (also referred to as eco-development) projects began to be implemented in the 1990s. In central India, eco-development initiatives were initially financed (from early 1990s to 2004) through World Bank/GEF loan-cum-grant. While eco-development projects contain some participatory components, this strategy was never meant to include people in decision-making processes related to conservation. Rather, this programme has been understood as an attempt to wean people off reliance on natural resources extracted from core zone of the PAs (see also Chapter 4 of this thesis, and Véron & Fehr 2011).

One of the turning points in tiger conservation, is the 2004 event frequently called “Sariska debacle”, when tigers in Sariska TR in Rajasthan became locally extinct. The main reason for tiger loss was reported to be poaching, but assisted by (retaliated) local villagers which reminded scientists and policy makers how local people and their support are of paramount importance for wildlife conservation (Tiger Task Force 2005; Rastogi et al. 2012). A Tiger Task Force (TTF) assembled by the Prime minister, in their report called for more inclusion of local people in conservation, TTF recommendations also spurred many policy and institutional changes: NTCA was given statutory status and the Wildlife Crime Control Bureau was established. Moreover, scientists got better access to TRs; their engagement was increased with a scientific monitoring system established to more accurately track and estimate tiger numbers.

Since the events at Sariska, there have been calls for a management shift to landscape-scale tiger conservation with greater participation of local people, sectoral integration and integrated land management, strengthening FD capacity for collaborative management (Tiger Task Force 2005; Planning Commission 2011). As a response,

scientists identified 6 large tiger landscape complexes in 18 Indian tiger states (Jhala et al. 2011) and NTCA requested all TRs to create new management plans (Tiger Conservation Plan, TCP) with corridor management plans included. Out of 48 TRs in India, NTCA approved 27 TCPs (NTCA 2015c)

The central Indian landscape complex (including the eastern Ghats) is one of the 6 identified large tiger landscape complexes in India and it is composed of 19 tiger reserves and other protected areas, spreading over the States of Madhya Pradesh, Chhattisgarh, Jharkhand and parts of Rajasthan, Maharashtra, Odisha and Andhra Pradesh (Jhala et al. 2011). The connectivity between these reserves is of varying strength and there are only 3 functional tiger meta-populations with relatively good connectivity in this large landscape which are located in central Indian highlands, namely Pench-Kanha-Achanakmar, Satpura-Melghat and Tadoba-Chandrapur (Jhala et al. 2011).

The forest patches that serve as corridors are still not in the legal domain of PAs in India, and they are vulnerable to conversion to other land uses (Yumnam et al., 2014) such as mining, highways, railways and agriculture (Vattakaven 2010; Fernandez 2012). The central Indian landscape is one of the most fragmented landscape complexes, and so emphasis on landscape-scale conservation instead of protected-area centric conservation is considered very important for tiger conservation there (Yumnam et al. 2014). In the central Indian highlands, only Kanha and Melghat have TCP approved, and are yet to be fully enforced (NTCA 2015c).

Results

Here the results organised around different themes from our interview data is shown. We describe perceptions around TRs and their conservation model, perceptions about forest department, and implementation potential. We finish with the interactions between FD, NGOs and local people. **Table 3.3** provides a snapshot of the actors in Maharashtra state at the time of the fieldwork.

TABLE 3.3. ACTORS IN THE LANDSCAPE AROUND TIGER RESERVES IN MAHARASHTRA. A SNAPSHOT OF THE SITUATION DURING THE FIELDWORK(2013).

Actor name	Actor Group	Roles & Interests
Villagers	Resource Users	Access rights to forest in buffer zone, main occupation: agriculture and labour.
Tourist sector	Resource users	Private resorts around TRs, tourist resort owners, tourist guides, drivers
Honorary Wildlife Warden (local NGO)	Monitoring, leadership	Anti-poaching, facilitation of communication between FD and local community, etc.
Local, National and Federal NGOs	Resource monitoring, awareness rising, FD capacity building,	Wildlife research, tribal support, monitoring, consultation, anti-poaching
FD (Maharashtra state)	Local managers	Implementation, management and monitoring
<i>Maharashtra Forest Development Cooperation</i>	Resource users	State agency, Eco-tourism activities in TRs
Researchers	Resource monitoring	Wildlife research – Wildlife Institute of India, Universities, Centre for Wildlife Studies
Government - national	Regulator	Maharashtra Ministry of Forests: management and conservation of the forest and wildlife
Government - federal	Regulator	MOEF&CC

SOURCE: OWN ELABORATION.

TIGER RESERVES IN CENTRAL INDIA

Theme: Success and the drivers

Interestingly and despite various internal and external threats (habitat fragmentation, scarcity of prey species, poaching) threats to tiger survival (see review by: Rastogi et al. 2012), all interviewees acknowledged that without tiger reserves there would be no tigers in India today. Thus, the legitimacy of tiger reserves in achieving large carnivore conservation was not in question. Moreover, interviewees perceived improvements in tiger conservation and PA management over the years. This was accompanied by more

funding directed to TRs, management evaluation exercises conducted every 4 years, scientific monitoring by camera trapping and, overall, more research in TRs.

Additionally, the awareness of conservation importance at the federal and district government levels was perceived to be important for improvement (higher level FD officer, Pune, April 2013). Moreover, the perception of pride at the state level is very important for a willingness to change or improve management practices: “*I think that's important that state takes pride that: ‘We are going to be the best in managing wildlife!’*” (wildlife scientist, Dehradun, May 2013). Nevertheless, other scientist warned that pride and emotionally driven conservation might lead to lock-in and reinforce tiger-centric conservation, excluding other values while following the vision of only few powerful actors, without holistic understanding of conservation goals (wildlife scientist, Dehradun, May 2013).

Although tiger numbers show constant increase (Jhala et al. 2015) the perceived failure in tiger conservation was that of creation of isolated and disconnected TRs, unable to protect dispersing tigers outside of PAs:

[Tiger reserves] are becoming good nurseries, where the tiger population has increased, but then, the tiger needs space and when it is going out [of tiger reserves] - where is it going? What's happening to the tigers that are going out? Are we in the position to manage those areas? Probably that is the only problem that we are facing right now. Tiger reserves as such -as isolated islands -have succeeded (Higher-level FD officer, Pune, April 2013).

Indeed, a 2010 tiger assessment confirmed decreases in the tiger occupied area outside of tiger reserves with loss of habitat quality and extent (Jhala et al. 2011, 2015). The lack of a long-term landscape vision, and still little knowledge about the ecological system was perceived to be one of the causes:

Because tiger numbers have been shown increase, but because we never had a vision or ecological understanding of larger landscape and things like that, we've created islands of tiger populations, which may not serve its own. Even the best Park like Kanha, we have packed with too many

tiger and we don't even know whether they are doing ecological role correct or not. So, we don't even know that structure well, dynamics or structure (wildlife scientist, Dehradun, May 2013).

Theme: Conservation Model and Participation

The fortress conservation model is perceived to predominate among interviewees, even though there is awareness among scientific staff and NGOs that more inclusive alternatives exist. Integrated conservation and development and provision of forest rights, even where legally possible, remained limited to FD legal understandings and has not led to significant change in interaction patterns between FD and local people:

“They [FD] think that in Tadoba, using [...] local people, allowing them to be tourist guides, that is participation. That is not participatory management!” (social scientist, Nagpur, April 2013).

As such, other participants in tiger conservation perceive the FD to hold fast to a narrow vision of participation by local people in tiger conservation.

Even if a law has changed for example, even the FD today does not know what the existing law is about [...] in reality, at the local level, it is a tribal or local forest dweller who is interacting with the forest guard. Between the forest guard and all, nothing has changed [...] because you see the department still thinks that you go out with the stick and whoever is entering the forest, you throw him out. And if you have to throw him out (environmental lawyer, New Delhi, May 2013).

The FD was perceived to prioritize the lives of tigers over human life, sparking anger on the part of local people:

If one tiger dies, there are ten jeeps that can go out. If a human kill happens [by tiger], a ranger may come after 2-3 hours. He [FD officer] will say: “OK, how much? You can take these 5000 rupees and we'll look at your compensation later”. And [local people] never get that money. How long do you think [local] people will tolerate this? They're getting impatient (social scientist, Nagpur, May 2103).

On the other side, a landscape-scale approach is conceptualized to have many conservation-related benefits and guarantee long-term tiger survival, but it also can lead to a better balance between conservation and development. It is perceived that through an integrated landscape approach, managers would avoid focusing on tiger numbers as the only currency, and stop disregarding all the other complex ecological functions. This would be beneficial not only for the tiger, but also for livelihood security of people in human-dominated yet forested landscapes of central India (wildlife scientist, Dehradun, May 2013).

THE FOREST DEPARTMENT: LEGACIES AND WORKING CULTURE

Landscape-scale interventions and strengthening of corridors to connect fragmented tiger populations were spurred by local tiger extinctions and concerns of lack of space for dispersing tigers (wildlife scientist, Dehradun, May 2013). We have noted above that the FD was perceived to be in a weak position regarding inclusion of local socio-economic concerns and participation of local people in tiger management. Here, we describe organisational characteristics that can better explain FD attitudes towards collaboration and local inclusion.

Theme: the FD and policy implementation

The FD is still perceived to be slow to respond and implement existing policies on the ground in terms of older participatory collaborative policies:

The Supreme Court, NGOs within India are influencing policy to some extent now. Therefore, I still don't think that policy's an issue. Policy is quite OK. Only if you can implement that policy, a whole lot of change can be brought on the ground. And then we can go back to policy: do we need to make and modify it a little more, do we need to incorporate some other stakeholders in it? That's a second generation issue. But we are not through the first generation itself. We have JFM since 1990. So I don't think we achieved as much as we could have through that existing policy. So I think it's OK at the policy level. Implementation and attitude [are the important issues] (social scientist, Nagpur, May 2013).

In addition, concerns were raised over implementation of newly developed tiger conservation plans:

Each TR has a management plan. Now the management plan transcends beyond the TR and there are landscape plans. So that is the requirement for sanctioning of the federal funds: unless a TR has a landscape management plan, federal funding should not be made available to the TR in question [...] So those plans are all in place now. Now, whether those plans are implemented or not, that is another thing. So, this is the beginning and over the years hopefully it'll get more and more professional and things should get only better.(wildlife scientist, Dehradun, May 2013).

However, legacy problems predominate in terms of implementation of new policies and law: *“We are fighting 21st century problems with tools from 20th century and mind-set from 19th century”* (IFS officer, Dehradun, May 2013).

Theme: the FD mentality and Legacies

State Forest Departments in Central India were perceived by scientists and policy makers to be unified, well-organised and disciplined, with a strong feeling of “brotherhood”, which had the potential to make cooperation within the department easier (wildlife scientist, Dehradun, May 2013).

However, a key barrier to effective implementation of policy was perceived to be the hierarchical organization of the FD:

The policy has changed but policy implementers have not changed. It is changing. I won't say they haven't changed at all, but it is so gradual. And then there is some change at the top level sometimes. There is some very little change, but we talk about decentralization, but there is no decentralization within the department. So decision taken from here on, ‘we are going to protect with the people’ - the guard doesn't know, the ranger doesn't know, the forester doesn't know (social scientist, Nagpur, April 2013).

Sometimes, inertia of the FD can be rooted in internal power structures and organizational hierarchy as noted by a local NGO member:

happens when the staff comes into the forest, he reports 'this happened' and when he tries to take the action, he doesn't have support of his senior officers. So, once or twice he tries. After some time sometimes [...] he will lose his motivation, he said 'I'll never get any benefit'. Sometimes he will get scolded: 'Why do you have to bring up these problems?', so after a few years, the senior officers don't want to be troubled (NGO, Pune, April 2013).

With rapid change in society, technology, and increasing threats to conservation, the FD was perceived not to be keeping up the pace. A higher-level forest officer observed that increasing complexities in which TRs were presently managed required more skills, knowledge or specific and dedicated staff for specific tasks, and adequate technological equipment (higher-level forest officer –territorial wing, Nagpur, May 2013).

Several internal and nested sources of this inertia were noted, including working culture, training, rotation and tenure lengths, willingness and capacity to learn.

The way of thinking and the working culture of FD were perceived to be rooted in the training of higher-level forest officers that further shaped their interaction with other actors and capacity to implement policy. Training was perceived to be the main reason why forest officers were less informed and not well adapted to the present threats and local challenges (wildlife scientist, Dehradun, May 2013; Higher level forest officer-wildlife, Nagpur, June 2013). An appropriate level of training was perceived to be either lacking for the lower level staff or too uniform and out-dated for higher-level staff. With training that relied mostly on forestry curricula, with little reference to modern conservation and participatory approaches, implementation of inclusive and collaborative policies easily ran into difficulties:

Because that is how the forest department has been trained and it continues to be trained in that way: We protect forest from the people, not with the people. It's 65 years after independence, but we do not know

that the British had a different objective for forest use [than we have]
(social scientist, Nagpur, May 2013).

Practice of rotation and short tenure length (3 years on average) started during the colonial period to prevent bonding of foresters and locals (Fleischman 2012). This practice was retained to the present and rotation of the top managers in the reserves was perceived to occur too often. In Maharashtra, staff rotation occurred every 2 to 3 years, however in some TRs in Madhya Pradesh the tenure period went to 5 years (wildlife scientist, Dehradun, May 2013). Many different NGO actors and scientists perceived that through frequent changes of personnel between very different positions (i.e. even from territorial wing to wildlife), rotation was observed to create loss of acquired skills and organizational knowledge, however, it was also seen to prevent local elite capture: it is a mechanism to remove unsuccessful managers from top positions more quickly (NGO, New Delhi, May 2013).

Promotions are only based on seniority, and it is not common for officers to be dismissed (Fleischman 2012). In such conditions, a wildlife scientist interviewed perceived that some managers were reluctant to learn and so there was no propensity to change, although the scientist amended that the situation had been improving:

[...] sometimes when you repeat the same thing, you feel comfortable with it and you don't want to change. Nobody wants change! So it was comforting situation for them [managers] and they're not bothering with what's happening. They were more interested in just reporting or managing something without understanding it (wildlife scientist, Dehradun, May 2013).

The FD showed resistance to change, both in terms of way of doing and way of thinking while implementing policies. This resistance was perceived to come from organisational structure and culture: out-dated training, granted promotions on seniority basis and short tenures, resulting in little incentive to learn and adapt to new challenges. This finally leads to inability to successfully implement new policies or programmes and might pose a challenge for interactive relations and opening towards collaboration with new actors for landscape-scale conservation.

INTERACTION BETWEEN THE FOREST DEPARTMENT AND OTHER ACTORS IN THE LANDSCAPE

Here we show interactions of FD with the other actors in the landscape: scientists, NGOs and locals to understand vertical linkages between the actors.

Theme: Cooperation and coordination

There were large differences in perception among actors in terms of the ability of the FD to carry on decentralized relationships with other actors and cooperate across sectors. A scientist noted:

Intersectoral cooperation [...] is a challenge anywhere in this world. Every department has an ego, each individual has its ego. Crossing those barriers and bringing everything together is quite a skill needed by a manager. I think that's where we need to develop the skill of these managers (wildlife scientist, Dehradun, May 2013).

There was a perceived need for coordination among different departments in the landscape and the State Board of Wildlife chaired by the state Prime Minister orchestrates this:

[...] From agriculture department, from animal husbandry department, from mining department. So once you have committee under the chairmanship of the chief minister who is overall in charge for the entire state, then this inter-ministerial or interdepartmental issues can be effectively addressed or resolved. (wildlife scientist, Dehradun, May 2013)

However, realities on the ground still appeared uncoordinated, and silo thinking predominated. The FD was frequently in conflict with other departments. Coordination involving different sectors in local agricultural development attracted criticism on the grounds that spatial competition between different actors, and between domesticated animals and wildlife were becoming a problem. An FD interviewee from Maharashtra explained these conflicting mandates of different departments:

[At the Tiger reserve level, there] are actors, other government departments who are working directly and indirectly. For example there is the animal husbandry department. Their mandate is to [...] give the goat, sheep and other various cattle that is distributed among the villagers free of cost to improve their livelihood [...] But if these cattle, goat, sheep enter in the tiger reserve, what will happen then - two important factors. One is it [livestock] will compete with the herbivores. It will ultimately dwindle resources there [inside tiger reserve] we could increase the grasslands, we could increase the water availability, but now, same thing is being shared by these cattle, goat, sheep. So there is direct competition with the herbivores and domestic animals. Not only that, many times domestic animals are not immunized properly. So what will happen? There are some common diseases - like foot and mouth and many others. Diseases will be transmitted from domestic animals to wildlife. And then a lot of mortalities and other things can happen and has happened in many parks [...] and naturally, again the resource will deplete, it will impact the tiger[...] (Higher-level officer, Nagpur, May 2013)

Theme: Retaining control

Nevertheless, the FD might actually reinforce these conflicts while struggling to retain control over the land and resources:

We still think that the FD is the only agency who is going to save tiger [...] The FD is the primary agency that can save or that has the responsibility of saving that, but along with this forest agency there are lot of other departments: say rural development, health department, animal husbandry department is very critical for tiger conservation. Why I'm saying, because despite our best efforts we cannot make all the TRs free of human settlements, even if we make core Critical Tiger Habitat free of human settlements, in the buffer people will continue live and we need to make space for tigers in those buffer areas so in order to do that we need to look at development of those villagers - how best we can help

these people, ok, that's why you bring in the rural development, you bring in the animal husbandry department because everywhere people who are living major problem is competition with the livestock. So, disease transmission is another thing, FD cannot go and inoculate all the things (wildlife scientist, Dehradun, May 2013, 14627:16574)

The FD was frequently critiqued by scientists and NGOs for its reluctance to receive input from others. A local NGO perceived FD to an inflexible agency and a poor problem solver (NGO, April, 2013, Pune). The FD was seen to have the “mentality” of ultimate power in the territory: “I’m the boss of this area, others are all inferior to us” but this attitude frequently depended on the individual behaviour of the manager (wildlife scientist, May 2015, Dehradun).

Moreover, from the attitude of power and control also stems the perceived reluctance to receive inputs from local NGOs as this might affect power balance or simply might mean more (unwanted) work for the FD. As stated by an environmental lawyer and several NGO interviewees, pointing to any FD malpractice leads to exclusion of NGO actors from a TR which creates deeper power asymmetries and affects transparency and trust levels

Theme: Trust towards NGOs

Trust issues ran both ways, with FD staff expressing concerns about people working against them. The case of NGOs creating narratives to attract the attention of funding agencies was raised. An FD officer talked about how he perceived NGOs to be sitting in air conditioned hotel rooms and conducting workshops where they blame the government and generate “new” problems to attract even more money from funders as a FD interviewee said (higher level officer, Maharashtra Forest Corporation, Nagpur, May 2013). “They use tiger as a commodity” (higher forest officer, Pune, April, 2013). There was a concern that NGO staff did not represent local communities, and that the majority of NGO personnel came from cities removed geographically from protected areas (higher level officer, Maharashtra Forest Corporation, Nagpur, May 2013). Many different state and non-state wildlife-oriented NGO interviewees stated how pro-tribal NGOs are perceived as a danger for people-park relationships.

Distrust sometimes existed between FD and wildlife-oriented NGOs as well. This played out in terms of poor horizontal communication of problems on the ground: “when we [wildlife-oriented NGO] give a recommendation [...] that just stays at that level, unless the officer is really good, unless he [forest officer] says: ‘you tell us, you’ve done research’” (NGO, Pune, April 2013). NGO staff were thus sometimes perceived to be poorly informed in comparison to FD officers about local realities related to tiger conservation, and this : “Sometimes officers are saying: ‘...we [FD] have been here, we know more than you’” (NGO, Pune, April 2013).

In some cases where such poor relationships have been built, the FD has excluded other actors from having a voice in management: “So, if I tell him, they will not allow us to work there. So, we know what is happening, but they are not ready to admit. I mean they are not interested first of all” (NGO, Pune, April 2013). The threat of exclusion in some cases may encourage NGOs not to speak out about problems:

If you shout too much against FD, you may not be allowed to enter the park at all so therefore you can be punished for ever, so therefore the whole tendency is not to annoy them. So therefore you will find that most wildlife groups have been very silent on the most of wildlife issues because they fear that if they shout they won't be allowed to enter into the park. They keep quiet (environmental lawyer, New Delhi, May 2013).

Theme: Local people and FD

There was basic agreement that local communities were important actors in tiger conservation:

We don't have wildlife because there's protection. We have wildlife because the other stakeholders don't want the wildlife to go, especially in central India. So I think the department realizes now that these stakeholders play an important part, and it's a give and take. So now, the local communities are considered as an important sector (NGO, Nagpur, May 2013).

There was an understanding that inclusion of local people was an increasingly urgent issue: “this is the only thing that is left to do, and we have no other option” (NGO, Nagpur, May 2013).

However, authority of the FD dominated in relationships between the FD and locals. Authority was often perceived to be used towards enforcement and exclusion policies with regard to management of protected areas. Authority was seen to be manifested in ground level staff with a “mentality” of enforcement, and exclusion: “most of them [FD] avoid people, so they think that people are the problem. That mentality has to be changed” (NGO, Nagpur, May 2013). As quoted earlier, instead of friends, the FD might be creating “conservation foes”, as their focus on giving priority to tiger over local benefits, or bringing tourists in the TRs while curtailing local rights might foster feelings of resentment and injustice for locals. This was tied to observed adverse impacts on wildlife through retaliation (social scientist, Nagpur, May 2013). A scientist noted that this dissonance between local priorities and conservation was spurred by imposition of a foreign set of values:

I still know that lot of people are talking that: ‘all those [local] people may not know anything so we will decide for them’. So tiger conservation is important for society, although people currently may not agree to it, but we know that it is right. (wildlife scientist, Dehradun, May 2013).

Based on interactions with the FD and history of conflict, local communities were perceived by FD personnel and scientists to be distrustful (higher level FD officer, Nagpur, May 2015) and suspicious (social scientist, Nagpur, May, 2013) towards FD.

However, there was still an understanding on the part of FD staff that local people needed time to build trust and to understand new roles being adopted by the FD:

People have never been given this idea that the forest officer will come and work with you. People have been talking: ‘if you see the forest guard, run away’. Now we are saying, ‘no, if you see the forest guard, come meet there, put your problem there’. So this is a very slow process. It may take years to get there. Last 10 years we are working but still I’m

100% sure that we have not been able achieve the expected result which we were expecting, through good relationship work (Higher-level FD officer, Nagpur, May 2015).

It is perceived that the predominant sentiment of local people towards the FD is still mainly fear: “Locals might feel fear of FD, but there is no respect for FD as it is the only department who does not provide any service” (wildlife scientist, Dehradun, May 2013).

There has been significant pressure from the locals, not to expand the existing TR network, or size of individual PAs, due to the perception that the FD has poorly handled the socio-economic dimensions of conservation but also because of changing perceptions of local people:

Because their [local people] true aspirations have changed, nobody wants tiger reserve sizes to increase. There are very tough laws if you're around a national park and sanctuaries, within 5 km, 10 km there should not be any development which is contrary to conservation. So that imposes a restriction on people's economic benefits. So there are a lot of things that are there that people don't support. Actually a lot of alienation has happened with conservation (wildlife scientist, Dehradun, May 2013).

Difficulties in implementing landscape-level conservation can be related to sharing territorial authority and power, difficulties in crossing sectoral boundaries and lack of meaningful communication. The FD seems to be interested in retaining territorial authority not only inside core zones of PAs where it has a legal right to an exclusionary approach, but even in buffer zones where it is obligated to pursue an inclusive agenda. This presents some difficulties in achieving a balance of protection and responding to other landscape drivers affecting conservation outcomes.

Discussion

A landscape approach that includes tiger conservation and PA management is argued to have more “common entry points” for different landscape actors and could also serve as a source of a consensus among them (Sayer et al. 2013). Based on our interview data we identified main themes presented above, accordingly we identified three main points problematizing the shift towards landscape-level conservation on the part of the FD: 1) difficulties in changing and implementing new practices strongly rooted in FD organisational culture and structure; 2) lack of information flow and trust between FD and other actors; and 3) poor history of FD in integrating and internalising multiple functions other than pure forest protection, such as issues of local livelihoods and development. This will be further discussed in the following sections.

CHANGING FD VALUES AND BEHAVIOUR

Values and goals of foresters are still under-researched area and organisational characteristics of public agencies that manage parks are (too) often disregarded from the picture of landscape-level approaches and collaborative management (Lawrence 2007). With our research, corroborated by other empirical findings from the Indian context, we found that 1) traditional, hierarchical and inflexible organizational structure (Kumar & Kant 2006; Sood & Gupta 2007) 2) rooted in the century-old tradition of implementing exclusive approaches (Rastogi et al. 2012), 3) emphasis on rational scientific principles over local knowledge, and 4) a strong focus on strengthening control over land (Véron & Fehr 2011) influence landscape collaboration potential.

Although landscape conservation plans are now required by the central government and NTCA, foresters encounter many difficulties in implementing such an approach. For example, foresters are often asked to implement participatory policies and decentralize power to other actors, but they themselves do not have training in participatory activities and they have not yet experienced decentralization in their own organisations (Lawrence 2007). These cognitive and institutional issues (and their interactions) were perceived to highly influence resistance to change and prevent from opening up towards collaboration in other contexts (Waylen et al. 2015). Therefore, internal organizational changes are needed to alter foresters’ ways of thinking and modes of action. In order to

adapt to ever-increasing demands of new policies, higher expectations of policy-makers, and respond to increasing management complexities of social-ecological systems, interviewees external to the FD agreed that the FD was in need of reform.

As perceived by many interviewees, “good officers” and their leadership role on the ground, as well as their interest and self-motivation were instrumental for a shift to landscape level conservation. However, the current organizational structure and a rather inflexible organizational environment, besides the internal power relations, insufficient knowledge and silo thinking might be a further impediment to leadership. Interviewees suggested a few problem-solving strategies: carefully planned tenure length and voluntary postings that may be able to spur intrinsic-motivation and better protection from unwanted political influence. Moreover, if training of higher-level officers better reflects the need for a collaborative and holistic approach with respect to conservation, managers may be the ones to facilitate social connectivity across landscape.

Special attention has to be given to the ground level staff. They are the ones who implement policies and interact with local people. Therefore, their training and capacity building has to reflect policy change. This has been also noted elsewhere (Sood & Gupta 2007; Fleischman 2012). A challenge to development of capacity of ground level staff is the communication gap between ground and top levels of the FD due to cultural and social (status, education) and physical (cities vs. forests) distances. This easily prevents change and adaptability. Bi-directional flow of information is needed and top managers can fill these gaps with good leadership skills.

Leadership and a clear vision are recognised by various interviewees to be important for better conservation outcomes. It was frequently perceived that there are passionate visionaries within the FD as well as within policy-makers at both the federal and the state levels. It remains to be seen, however, whether these actors can realize the potential of collaboration in delivering desirable conservation and livelihood outcomes across landscapes important for connectivity of tiger habitat.

IMPROVING INFORMATION FLOW AND TRUST

More open organizational structure with flows of information through the FD chain of command in both ways, might also help in learning how to take or filter needed

information from other (state and non-state) actors in the landscape (such as NGOs) and facilitate crossing sectoral boundaries necessary for a shift to landscape doing and thinking.

Social connectivity and communication across landscape is frequently constrained by the differences in “frames” that exist among actors including different “languages”, values and emotions or what Vaccaro and Norman (2008) call the “cultures of nature”. Frames are ways through which people see reality (Mostert et al. 2007). Our results clearly show how different landscape actors, FD, NGOs and locals, have different perception of tiger conservation priorities and aims. Acknowledging different frames can help actors in “opening up” (Stirling 2008) debate to different perspectives, improve trust and increase respect between potential collaborators, spur social learning in the landscape (Mostert et al., 2007).out-dated

If there is meaningful horizontal and vertical communication among actors and a common vision is negotiated and agreed upon, the efforts of different actors could be more easily coordinated to have meaningful direction. Therefore, there is a need for common platforms to exchange ideas, facilitate communication and share a common vision as well as bridge different cultures at different levels of governance. This is a challenging task because of much diversity of values and a wealth of negative past experiences. One crucial issue for communication processes and hence, another precondition for tiger conservation in and outside PAs, is the provision of arenas for trust building among different actors who operate at different levels.

WORKING WITH LOCAL PEOPLE IN THE CORRIDORS

By holding to exclusive modes of governance and retaining territorial authority, the FD has stifled collaboration. Other actors engaging with local communities have noted persistence of conflicts at the local level, and NGOs engaged with local communities have found themselves on the margins. Others have brought forth evidence of retrenchment of the FD into a top-down, self-contained structure. Some researchers claim that inclusive policy implementation led to recentralization while decentralization was supposed to be happening (Ribot et al. 2006; Véron & Fehr 2011) as, among other factors, there was no proper change in FD attitudes towards people-oriented policies

(Rishi 2007). Researchers attempted to explain this through organisational resistance coming out of the colonial legacy of the FD (Guha & Gadgil 1989; Kumar & Kant 2005). Our research corroborates these chains of reasoning. More recent studies with respect to the implementation of The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (FRA) draw similar conclusions and add to the debate on FD resistance to change in relationships with local people and their forest rights (Springate-Baginski et al. 2012; Kashwan 2013; Kumar et al. 2014). For example, Springate-Baginski et al (2012) show how the Andhra Pradesh FD has been obstructing policy reform and implementation of the FRA, demonstrating significant opposition to the rights-based approach.

A consensus on corridors among FD and locals might not be easily achieved. The alienation and conflicts between people, parks and foresters have historical roots in colonial rule and unsettled and constantly curtailed forest rights that turned forest dwellers into “encroachers” on their own land (Guha & Gadgil 1989; Macura 2010; Rastogi et al. 2012). Corridors, if not planned with consensus of local people that inhabit them, might be seen as infringement of local rights, which in turn might decrease needed local support for tiger conservation (Rastogi et al. 2014). It may also create “sub-cultures of resistance” against the implementing agency (Mukherjee 2009). Conflicts could be further sparked if implementation of FRA fails in the corridor forests.

Concluding thoughts

FD frequently has to simultaneously implement conflicting policies, including those pertaining to forest management, wildlife conservation, monitoring, law enforcement, tourism-related issues, and participatory projects. To this list is now being added collaboration with other actors in the landscape. Nevertheless, these public servants are still biased towards policing and their bureaucratic role. Therefore, there is a need to build well-trained staff of FD for addressing local people rights and needs. This has also been emphasized elsewhere (Sood & Gupta 2007)

Coordination with various state actors, especially the ones that have an influence on FD-local people interactions (e.g. revenue and animal husbandry departments), is

needed for successful efforts in landscape level conservation. NGOs might be strong enough to push for the policy change, but also foster communication between different players and have a bridging role in the landscape (Berkes 2009).

Decoupling social-ecological systems and “breaking down fences” (Hoole & Berkes 2010) is ultimately a coordinated multi-actor effort.

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CHAPTER 4

EFFECTS OF TWO STATE-DRIVEN PARTICIPATORY PROJECTS ON CONSERVATION KNOWLEDGE, ATTITUDES AND TRUST: A CASE OF A CENTRAL INDIAN TIGER RESERVE

Introduction

Researchers and policy makers emphasize that people's involvement in any form of forest management can support biodiversity conservation through a change in attitudes (Brechin et al 2002; Baral and Heinen 2007). Depending on the conservation intervention setting, one can observe varying levels of participation by local people, transfer of political power and control over decisions vested in local communities. Participation can span from nominal and passive, to consultation, or to active and empowering engagement in decision-making (Agarwal 2001; Drydyk 2005). The governance shift from socially exclusive towards more inclusive conservation policies started in the 1980's when these policies entered conservation practice through community-based conservation and natural resource management; efforts to integrate conservation and development; and co-management arrangements (Reyes-Garcia et al 2013). While some criticise the necessity of large-scale participation for policy effectiveness (e.g. Cooke and Kothari 2001), others assume that people's involvement in forest management and conservation is able to modify their behaviour towards conservation action by changing their conservation knowledge and attitudes towards biodiversity as well as their trust towards protected area (PA) managers. This is assumed to, ultimately, lead to changes in biodiversity outcomes (see Persha et al 2011).

Despite the logic of this argument, it is very difficult to empirically test its second part, that is the link between behavioural changes (or people's involvement) and changes in ecological outcomes. Difficulties in getting empirical evidence are partially due to a temporal and spatial scale mismatch: biodiversity management and conservation happen at the landscape level, while changes in attitudes and behaviour happen at the individual or at the community level. So, the change in attitude of an individual does not necessarily reflect in measurable changes in conservation. It is, however, possible to test

the first part of the argument, regarding the causal link between participation and conservation knowledge and attitudes, in other words, the pathway through which people's involvement in forest management and conservation (participation) has an effect on biodiversity conservation. If participation helps raise conservation knowledge and attitudes (the first, testable, part of the argument), then it is possible that it will also ultimately affect landscape level conservation outcomes (the second, difficult to test, part); however, if the link does not exist, then one could safely discard participation as an effective tool for the conservation management.

To test potential paths between people's participation and conservation through behavioural change, we use applications of social psychology and attitudinal research (Ajzen 2001) to conservation (St John et al 2010) (see **Figure 4.1**)

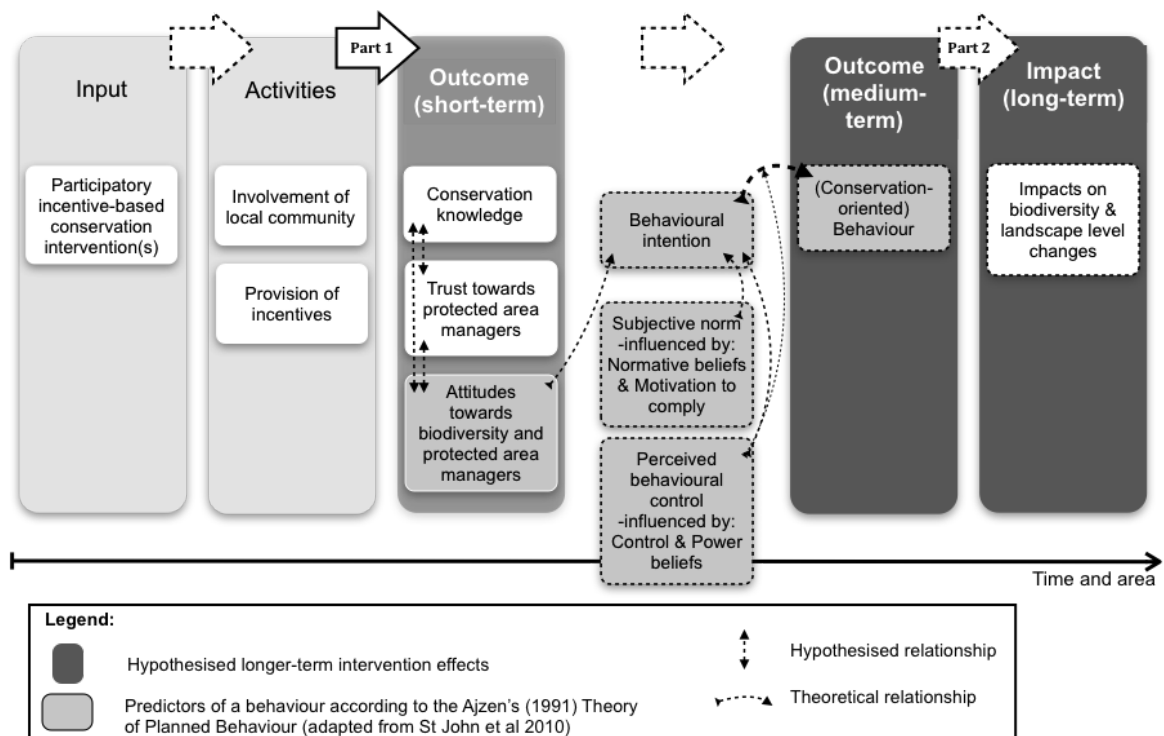


FIGURE 4.1 A THEORY OF CHANGE SHOWING INPUTS, ACTIVITIES AND THE EFFECTS OF PARTICIPATORY CONSERVATION INTERVENTIONS THROUGH HYPOTHESISED AND THEORETICAL CAUSE-EFFECT RELATIONS BETWEEN PARTICIPATION, BEHAVIOUR AND CONSERVATION (SOURCE: ADAPTED FROM AJZEN 1991 AND ST JOHN 2010)

Experiential knowledge can be defined as a correct belief (Schultz 2002) and it is a necessary prerequisite for behaviour (Frick et al 2004). Although knowledge cannot predict people's behaviour, the lack of (conservation) knowledge is found to be an internal barrier for a person's behaviour even if there is a strong motivation to act (Schultz 2002). In other words, individuals who have less knowledge about conservation rules might be less likely to involve into conservation-oriented behaviour (e.g. tree planting) or to avoid illegal behaviour (e.g. tiger poaching). Therefore, people's level of knowledge about conservation rules might indirectly influence their behaviour. According to theory of planned behaviour (Ajzen 1991), attitudes are more strongly but also indirectly linked to behaviour, as they act along with the social norms and perceived behavioural control to influence individual's behaviour through changes in their behavioural intentions. Therefore, the influence of the group is crucial for a person's behaviour. Negative conservation attitudes can lead to biodiversity-related conflicts in a PA (White et al 2009), which can have negative effects on the overall conservation outcomes (through, for example, retaliatory behaviour). Trust is the belief that a person (or an institution) will perform its role according to socially defined and expected responsibilities normally associated with it (Hawdon 2008). Trust (or lack of it) is argued to be highly associated to success of collaboration in the natural resource management (Bouma et al 2008; Baral 2012; Stern and Coleman 2014). A trustworthy relation of local community with the park administration can be a source of legitimacy, which can lead to a better voluntary compliance with the park regulations (Stern 2008; Bouma and Ansink 2013) and therefore, less illegal activities.

Over the last three decades, in India's forested yet human-dominated landscapes, two state-driven interventions have attempted to increase people's involvement in forest management and conservation: Joint Forest Management (JFM) and ecodevelopment (ED) projects.

JFM is a collaborative arrangement between local people and public entities whose aim is to sustainably manage state-owned forests outside of core zones of PAs (Nayak and Berkes 2008). JFM is a top-down state initiated decentralization (Kumar et al 2014), started in 1990 and impelled by the National Forest Policy, 1988 (GOI, 1988), which

was the first legal act after the Independence to recognize the value of involvement of local people in the natural resource conservation. At the local level, JFM operates through committees installed in villages with assigned adjacent forest patches. In exchange for so called “social fencing” i.e. safeguarding, protection and improvement of the forest, forest department (FD) provides villagers with usufruct rights and limited benefit sharing through (negotiated) extraction of Non-Timber Forest Products and the share of revenue from timber sale. Nevertheless, all the specific JFM arrangements depend on the states and their adaptation of the central government JFM rules. Currently financed by the central government through National Afforestation Policy scheme, JFM programme was initially partially funded by various foreign agencies including World Bank (WB), UNDP, etc. (Singh et al 2011).

In India, Integrated Conservation and Development Projects (ICDP) are known as ED projects. ED is implemented around core zones of PAs (in a 5 km belt) with the main aim to conserve the core zone against human impacts. It operates under 1972 Wildlife (Protection) Act, which prohibits locals to get usufruct rights from the core zones of PAs. At the village level, it runs through ecodevelopment committees (EDCs). “India ecodevelopment” project was approved in 1996 and was actively funded until 2004 by Global Environmental Facility (GEF)/WB part-loan and part-grant, contribution from “beneficiaries” (local people) and state and central governments. In total, US\$ 61 million was spent in 5 tiger reserves and 2 national parks, 54% of which was invested in village ecodevelopment (World Bank 2007). Village ecodevelopment was designed “to reduce negative impacts of local people on biodiversity and increase collaboration of local people in conservation” through: “[...] participatory microplanning [...], reciprocal commitments that foster alternative livelihoods and resource uses [...], special programmes for additional joint forest management, voluntary relocation and supplemental investments for special needs” (World Bank 2007:2). After “India ecodevelopment” finished, village ED continued to be part of the management plans of many PAs, especially tiger reserves, but with reduced funding.

The two types of projects have different reasons behind people’s involvement and none of them has managed to attract the participation of all people in the communities where they operate, as it was initially planned. Furthermore, both types of projects are

frequently criticised for including participation only in their rhetoric, not in practice (Hildyard et al 2001; Tiger Task Force 2005).

Few case studies have produced evidence that ED has almost no impact on promised outcomes due to i) the absence of genuine negotiation between local communities and PA authorities, ii) a poor understanding of project objectives, and iii) the missing links between delivered incentives and obtained conservation outcomes (Mahanty 2002; Arjunan et al 2006; Gubbi et al 2009; Dejouhanet 2010). JFM has been more frequently evaluated, for social and ecological success, with mixed results (e.g. Kumar 2002; Murali et al 2002; Damodaran and Engel 2003; Bhattacharya et al 2010).

Evaluations of the two participatory conservation interventions in India provide only anecdotal evidence of their effectiveness because such evaluations either: measure only one type of outcome (mostly ecological); without removing rival explanations of the observed effects; and do not adjust for selection bias occurring due to non-random assignment of such interventions (for comprehensive review see Shyamsundar and Ghate 2014). Moreover, rigorous studies assessing the effects of participatory conservation interventions with causal inference are very rare (Miteva et al 2012); except some recent studies on the ICDP evaluation (Morgan-Brown et al 2010; Weber et al 2011; Bauch et al 2014), on devolution and community based-management and conservation (Jumbe and Angelsen 2006; Ameha et al 2014), and on payments for environmental services (Hegde and Bull 2011). To our knowledge, credible evaluation studies of ED and JFM in India have not been conducted yet.

The work presented here uses household cross-sectional data collected in the buffer zone of Pench Tiger reserve (PTR), Madhya Pradesh (India) and a quasi-experimental design to evaluate the causal effects of state-driven participation, on the social outcomes in two types of programmes (JFM and ED). The diversity of participatory incentive-based strategies in forest management and conservation implemented around PTR, sometimes with geographical overlap, provides an ideal case to study: i) whether local people's conservation knowledge and biodiversity attitudes vary between participants and non-participants; and ii) whether the type of participatory intervention (JFM or ED)

matters in terms of people's conservation knowledge, biodiversity attitudes, trust and satisfaction with the management authorities.

Case Study¹²

STUDY SITE

The research was conducted in the buffer zone of PTR, in Seoni and Chhindwara districts of Madhya Pradesh. PTR (**Figure 4.2**) covers total area of 1179.6 km² divided between two zones: a core (411.3 km²) and a surrounding buffer (768.3 km²). Although it was included in Project Tiger in 1992, the area was under protection since 1977. The core zone was officially notified in December 2007 and the buffer in October 2010, but until 2013, buffer zone stayed under control of three territorial divisions of the FD: South Seoni, East Chhindwara and South Chhindwara. In 2013, part of the Reserve under East and South Chhindwara Forest Divisions were handed to the wildlife wing of FD i.e. PTR authorities. In March 2014, during our fieldwork, control of South Seoni division was handed to the PTR authorities.

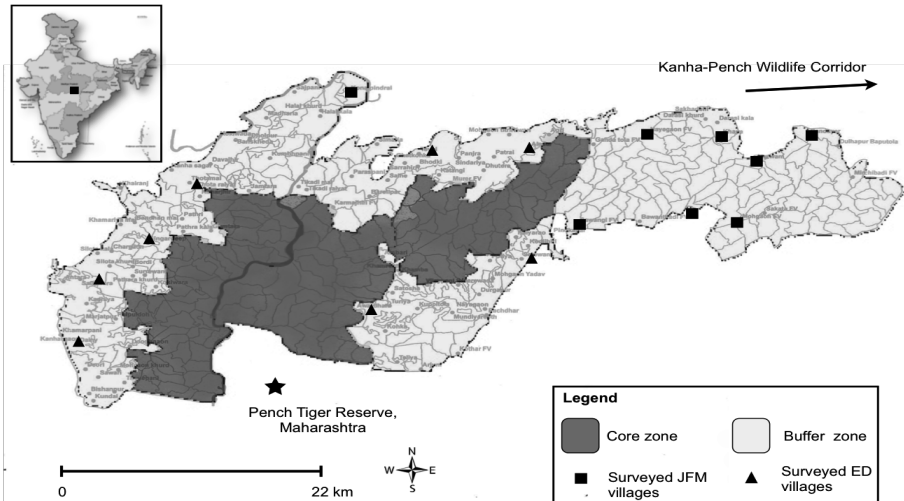


FIGURE 4.2 STUDY LOCATION: PTR, MADHYA PRADESH WITH SAMPLED VILLAGES (SOURCES: PTR ADMINISTRATION OFFICE; [HTTP://EN.WIKIPEDIA.ORG/WIKI/OUTLINE_OF_INDIA#MEDIAVIEWER/FILE:INDIA-MAP-EN.SVG](http://en.wikipedia.org/wiki/Outline_of_India#mediaviewer/File:India-map-en.svg))

¹² Part of what is reported in the case-study description is based on direct observations, document analysis and interviews carried out during the 4 months long fieldwork in PTR.

The study area is undulating terrain with small hill ranges supporting three main forest types: southern Indian tropical moist deciduous (slightly moist), southern tropical dry deciduous (with teak *Tectona grandis*), and southern dry mixed deciduous forest. The core zone supports many species of high conservation concern and represents Critical Tiger Habitat, which is an inviolate space “*required for the sustenance of viable populations of tiger and other wild animals*” and no human disturbance, habitation, resource extraction or agriculture is allowed (MOEF 2007:1).

Buffer zone is multiple use area with lower degree of habitat protection and *de jure* rights for resources access and cultivation exists. There are 99 villages (around 60000 people) located within the first 5 km around the core zone; 20 more villages are located in the rest of the buffer zone. More than 60% of the local people are *Adivasis* (i.e. original inhabitants), with the prevailing percentage of Gond tribal group. There is also smaller percentage of the Scheduled Caste and Other Backward Castes with very low proportion of General caste. The main occupation of local people is (subsistence) agriculture and wage labour. Villages (in the first 5 km around the core) are estimated to have around 60000 cattle.

JOINT FOREST MANAGEMENT AROUND PTR

JFM in Madhya Pradesh commenced in 1991. Depending on the quality of the forests being managed under JFM, there are two types of committees: 1) village protection committees (VPC) for rehabilitating degraded forest areas with density of forest cover lower than 40% and 2) forest protection committees (FPC) for protection of forest with forest cover density above 40%. The benefit sharing through these committees is different as it depends on the quality of the forest being managed. Committees have “general body” where all people from the village can participate and “executive body” that is composed of 9-11 members, a secretary from the FD (usually lower rank forest officer) and a joint secretary from the village (to take the future role of the secretary) (MPFD, 2014). Depending on the funding flow, villagers also receive household utensils (e.g. smokeless stoves, blankets, LPG connections) that could help them decrease forest dependency. The majority of the committees in the buffer zone of PTR are FPC.

ECODEVELOPMENT AROUND PTR

PTR was one of the selected sites where “India ecodevelopment” project commenced in 1996-97. Up to 2005, it released 268.6 million rupees (approx. US\$ 6.1million) in PTR (Pench Tiger Reserve 2012). Its implementation continued through EDCs in 99 villages surrounding the core zone of the park in the 5km belt. As in JFM, all the people from a village constitutes EDC “general body”, while “executive body” is composed of 9-11 members and a secretary from the FD (usually lower rank forest officer). EDC distributed household assets and initiates village development works for decreasing pressure on forests and for alternative (non-forest) livelihoods. Household level assets distributed were pressure cookers, gas cylinders and stoves with improved efficiency, dung-powered biogas plants, bicycles, and sewing machines. In order to create a sense of ownership, beneficiaries need to contribute 7-25% of the asset price. Community level provisions were ponds, wells, field banding, stop dams, electric pumps (for agricultural intensification); or village infrastructure: village roads, community halls and stalls (for meetings), game proof wall (for protecting wildlife entering villages, and livestock entering forest). Even after GEF/WB project ended, the EDCs remained in the villages with considerable smaller or even non-existent activities and intermittent funding that comes partially from the union and the state funds allocated for the PA management activities and partially from the share of tourism revenues (through PTR development fund). From 2005 to 2011, 13.1 million rupees (approx. US\$ 282000) were spent for ecodevelopment in PRT, which is about 22 times lower than the amount spent in period 1997-2005 (Pench Tiger Reserve 2012). Management authorities have been occasionally distributing gas cylinders, stoves, pressure cookers, organising IT skills classes, conducting some minor (mainly reparatory) works in the villages. Nevertheless, these activates are probably almost negligible in comparison to the ones during the “India Ecodevelopment”.

The JFM and the ED: differences

Although both programmes aim at promoting people’s involvement in conservation, there are differences between them. Given that PAs are governed by the Wildlife Protection Act, extraction of forest resources is strictly prohibited from the core zone of the park. So, there is no benefit-sharing from the core zone of the park to the

surrounding villages and this is the main difference with the JFM (Badola 2000). The ED is implemented to shift local forest-dependent people away from the forests and find them alternative sources of livelihood. According to some authors, local people are seen only as “beneficiaries” (see Woodman 2002). By design, JFM seeks to involve locals in the forest protection and provides revenues from the adjacent forest that are shared among the local community.

Methods

DATA COLLECTION

Fieldwork was carried out between January and May 2014. We implemented quasi-experimental design with the two-stage, random stratified and systematic sampling. In total we sampled 16 villages (8 under each programme), located in the buffer zone of the PTR. From a list containing all the ED villages in the park surrounding, we further sub-divided the sample according to high and low amount of received benefits and randomly selected 4 villages from each stratum. JFM villages were matched to ED villages based on the population size, ethnic and caste composition, literacy rate, number of non-workers (using data from Census of India (2011)), and on proximity to forested area. On average, 20 households were surveyed in each village, with the first household selected at random and subsequent households sampled at intervals determined by village size (Bernard 2006). Questionnaires were administered to household heads, or to a person older than 21 if the head was not present (located in **Annexes 13 and 14**).

We carried out face-to-face structured questionnaires implemented by 5 non-local enumerators¹³ conversant in Hindi (Madhya Pradesh official language). The questionnaires were written in English, translated and conducted in Hindi and pre-tested in two villages located in the buffer zone. Before administering questionnaires, enumerators obtained an oral informed voluntary consent. Out of 320 collected questionnaires, 303 contained complete data and were included in the final analysis.

¹³ Hired professional agency for social research from Mumbai, first author trained the team for 2 days

Questionnaires contained close- and open-ended questions including demographic and socio-economic characteristics of the household, perceptions of the ED or JFM project, knowledge about the tiger reserve, attitudes towards biodiversity in general as well as trust in and satisfaction with the park authorities.

In addition, rich contextual and historical information on the projects' past and current functioning was collected through over 30 semi-structured interviews carried out with committee members and FD staff. We asked about activity of different internal and external stakeholders, possible conflicts between them, frequency and attendance of meetings, the level of local people engagement in decision-making processes, flow of benefits, and the distribution and demand of household assets. Each interview lasted an hour on average.

EMPIRICAL STRATEGY

We aim to estimate the causal effects on conservation attitudes of 1) the participation in ED and JFM versus no participation, and 2) participation in ED versus participation in JFM. Therefore, we focus on the Average Treatment Effect on Treated (ATT) which is defined as a difference between average observed effect with participation and the average counterfactual without the participation or with the participation in an alternative project (Dugoff et al 2014) (Equation 1).

$$ATT = E(Y_1 - Y_0 | P = 1) = E(Y_1 | P = 1) - E(Y_0 | P = 1) \quad (1)$$

The evaluation problem is that counterfactual ($E(Y_0|P=1)$) is unobservable (a participant cannot be a non-participant at the same time) and thus the researcher has to choose an appropriate substitute to estimate it (Caliendo and Kopeinig 2008). Moreover, in conservation projects, participants are not randomly assigned to the treatment or they do not have an equal opportunity to participate; that means that a selection bias and other factors that determine decision to participate might influence the observed outcome (Ferraro 2012). To overcome these issues and to create credible comparison, we apply propensity score (PS) matching, a statistical non-parametric method. PS (Equation 2) is a predicted probability of participating in the programme conditional on a set of observed covariates (X) (Rosenbaum and Rubin 1983). PS is specified through a binary choice modelling (probit or logit).

$$\text{Prob}(X) = \text{Pr}(P = 1 | X) = E(P | X) \quad (2)$$

HYPOTHESES AND EFFECTS: FROM PARTICIPATION TO BEHAVIOURAL CHANGE

To evaluate participation effects, we measure several intermediary effects of participation that, according to our theory of change (see Online Resource 1), can influence local people's behaviour and possibly affect conservation effectiveness: 1) conservation-related knowledge; 2) attitudes towards biodiversity, specifically, towards forests, tigers, and other wildlife; 3) attitudes towards PTR managers and 4) trust towards PTR managers (**Table 4. 1**).

TABLE 4.1 MEASURED EFFECTS AND RELATED QUESTIONS FOR PARTICIPANT (BOTH ED AND JFM) AND NON-PARTICIPANT HOUSEHOLDS

Measured constructs	Constituting questions, scores and rating scales
A. Conservation knowledge ^{a)}	Do you know about Pench Tiger Reserve? - Yes (1) / No (0); Do you clearly know where are the boundaries of the core zone? - Yes (1) / No (0); Do you clearly know where are the boundaries of the buffer zone? - Yes (1) / No (0); What is your definition of the buffer zone? - No knowledge (0), fair understanding (1), good understanding (2); Which activities are banned in the core zone? - No knowledge (0), knows 1 rule (1), knows 2 rules (2), knows 3 rules (3); Why do you think these activities are banned in the core zone? - No knowledge (0), fair understanding (1), good understanding (2); Which activities are allowed in the core zone? - No knowledge (0), fair understanding (1), good understanding (2); Scale reliability coefficient (α): 0.8253 (for H1) and 0.8085 (for H2) ^{b)}
Attitudes towards biodiversity ^{c)}	Do you like or dislike: Tiger? - Strongly dislike (1), dislike (2), neutral (3), like (4), like very much (5) Other wild animals? - Strongly dislike (1), dislike (2), neutral (3), like (4), like very much (5) Forests? - Yes (1) / No (0) ^{d)}

	Scale reliability coefficient (α): 0.5475 (for H1) and 0.5402 (for H2)
Attitudes towards PTR authority ^{e)}	Taking everything into account, how satisfied are you with the Tiger Reserve management authority? - Very unsatisfied (1), unsatisfied (2), neutral (3), satisfied (4), very satisfied (5)
D. Trust towards PTR authority ^{e)}	How much do you trust the Tiger Reserve management authority to work in your interest? - Not at all (1), not very much (2), neutral (3), a fair amount (4), a lot (5) ^{f)}

^{a)} Based on the work by Olomí-Solà et al (2012). Answers from open-ended questions 4, 5, 6 and 7 are coded into the different levels, assigning 0 score if a respondent did not know or gave the wrong answer and 1 for every correct answer. Final knowledge score is a sum of all the individual item scores divided by the highest aggregated score (=8).

^{b)} We assume that the awareness of park rules is more important for the compliance and conservation-oriented behaviour than the sole knowledge of the PTR existence and its location. Therefore, we have assigned different weights to the constituting questions of the conservation knowledge indicator.

^{c)} Attitude is a summary evaluation, a level of a favour or disfavour towards an attitude object (Ajzen 2001). In our case attitude objects are tiger, other wild animals, forests or park management authority.

^{d)} Collapsed to 1/0 format as 89.4% participants liked forests i.e. assigned score 4 to the statement.

^{e)} Agency-related effects are used only for the second hypothesis as people who are not participating neither in JFM nor in ED most probably do not have so frequent encounters with the Reserve managers and therefore answers to these questions are not pertinent for this part of the sample.

^{f)} Based on the work by Baral 2012. According to encapsulated interest theory trust is relational and can be defined as “a tripartite relationship in which A trusts B with respect to X” (Baral 2012, p.43)

Our hypotheses are as follows.

H1: People living in households that participate in any forest conservation programme (either JFM or ED) have more positive attitudes towards biodiversity and more conservation knowledge than people living in non-participant households. The rationale

behind this hypothesis is that involvement in the forest management might increase people's access to information and level of awareness, and this along with the received incentives and household assets, may change conservation knowledge and consequently affect biodiversity attitudes.

H2: People living in households that participate in ED have more conservation-related knowledge, more positive attitudes towards biodiversity, and better relationship (attitudes and trust) towards PTR managers than the people living in the JFM-participating households. The ED villages are closer to the reserve and they received substantial funding during India ED project. This might have left some legacy effect on their knowledge, attitudes and trust.

Defining treatments, counterfactual and reasons to particiPATE

For evaluating effects of participation, regardless of the programme type (H1), we created a treatment sample (1, N=212) that includes those households that a) received household assets (gas cylinder, pressure cooker, etc.) through either ED or JFM programs or b) were well aware of the village level activities executed through the aforementioned programs, even if they had not directly received any household assets. Households that did not have any knowledge about any of the two projects and never received any benefits, composed the control sample (0, N=91). We did not distinguish between households who received benefits before and households who also received benefits after the GEF/WB funding ended.

For evaluation of the effects of the participation and project type (H2), we analysed a subsample of the participants and evaluated differences in effects of the ED versus JFM. The first sample includes households participating under the ED program (1, N=118) and it is compared to a sample of households participating under the JFM program (0, N=81).

We assume that the decision to participate in either of the two programmes (H1) will be driven by different factors (H2). Therefore, we have two different sets of covariates to fit two propensity specification models. The choice of covariates is based on the theoretical considerations, previous research, administrative selection of the participants, and programmes' eligibility criteria. Moreover, we attempted to choose

covariates that are stable or deterministic with respect to time to make sure covariates are not affected by the treatment (Caliendo and Kopeinig 2008).

To model participation under H1 we combined nine covariates. Elements of human capital, such as household head gender, education and age, are all able to determine social status. Household size can determine labour availability and amount of benefits household can obtain from a forest. All these variables predicted participation in similar conservation interventions elsewhere (Agrawal and Gupta 2005; Baral and Heinen 2007; Parker and Thapa 2011; Hegde and Bull 2011) but were also found to influence conservation knowledge and attitudes (Heinen and Shrivastava 2009; Macura et al 2011; Olomí-Solà et al 2012; Carter et al 2014; Ruiz-Mallén et al 2014).

We hypothesise that economic capital, expressed through a household wealth index (possession of household durables and land, access to electricity), can determine project participation. On the one side, we expect very poor families to be more forest-dependent and probably more targeted by the ED or JFM projects. Nevertheless, the poor might have more difficulties in obtaining household assets, as they need to contribute to the asset value or more powerful society member may exclude them from getting provisions (elite capture). On the other side, wealthy families might not be interested in forest-related projects as they can draw incomes from other sources than the forests. Therefore, households with middle level of income might find it easiest to participate as they can afford assets provided by the projects. Economic condition has also been found to be a predictor of participation (Agrawal and Gupta 2005) and of conservation and wildlife attitudes (Infield 1988; Carter et al 2014).

To account for conflict management, received compensation for livestock loss or crop raiding was included in the model for testing H1. Frustration caused by the loss and no compensation for the costs might negatively influence willingness to participate in the conservation-oriented projects and decrease the institutional trust; result in negative attitudes towards conservation (Shibia 2010) and possibly lead to antagonistic behaviour (e.g. forest fires, wildlife poisoning) (Mukherjee 2009; White et al 2009).

Village distance to a closest forested area was included to account for forest dependency but also for disturbance by wild animals. This variable and closeness to the core were

also included in order to match households within similar locations (Ameha et al 2014) and therefore, the ones with similar social and economic background.

To account for the differences between the two projects (H2), we included ten covariates in the model. ED-participating households were slightly closer to the main roads and PTR, and better integrated to the market. These factors may open more opportunities for schooling and income generation. Apart from the head education and gender, literacy gap between men and women was accounted through the interaction term. As a proxy for household economic status we included cash income (per household size) and household electricity. Due to park regulations, grazing is curtailed, so difference in the livestock ownership was accounted in the model. Self-reported incidence of cattle kill by wild animals was included to proxy variability in potential for human-wildlife conflicts. Due to variation in market integration level, forest proximity was included to account for potential dissimilarities in forest dependence. Finally, participation in non-forest related groups was added to account for potential differences between ED- and JFM-participating households in the level of political activity.

Both models incorporated sampling weights (Dugoff et al 2014) to account for complex survey data and the variation in sampled village sizes (percentage of sampled households per village varied from 9.5% to 100%). Sampling weights were calculated as inverse probability of household selection into the sample: $SW=N/n$, where SW is sampling weight, N is total village population; n is number of sampled units (households).

The two models specified for estimation of PSs for the two samples are shown in **Table 4.2**.

TABLE 4.2 MODELS FOR SPECIFICATION OF THE PSS FOR TESTING H1 (LOGIT) AND H2 (PROBIT). FOR H1, DEPENDENT VARIABLE DENOTES HOUSEHOLD PARTICIPATION IN EITHER OF THE TWO PROGRAMMES (YES=1, NO PARTICIPATION AT ALL=0). FOR H2, DEPENDENT VARIABLE IS PARTICIPATION IN ED (YES=1, PARTICIPATING IN JFM=0)

	H1: Logit model	H2: Probit model
Variable	Coefficient (SD)	Coefficient (SD)
Household size	-0.0936 (0.0821)	/
Head gender (1=female)	0.767*(0.462)	-0.949*** (0.312)
Head education (1=has formal education)	-0.0886(0.319)	-0.482*(0.251)
Gender * education (interaction)	/	0.105(0.611)
Head age: 40 or older (1=yes)	-0.465(0.328)	/
Cash income per capita (1000 INR/person) b)	/	0.390*(0.201)
Household wealth index ^{a)}	0.207(0.162)	/
Has electricity (1=yes)	/	-0.673(0.471)
Ownership of livestock (1=yes)	/	-0.589** (0.285)
Livestock killed by wild animals (1=yes)	/	-0.919*** (0.228)
Compensated for crop raiding or cattle lifting incidents (1=yes)	1.299*** (0.331)	/
Participation in non-forest related groups (1=yes)	/	-0.499* (0.293)
Distance to the nearest forested area (in km)	-0.455** (0.186)	0.670*** (0.151)
Distance to the core zone (1=0-2, 2=2-5, 3=5-14, 4= 14-19 km)	-0.824*** (0.146)	/
Sampling Weights	-0.0232(0.0396)	-0.0305(0.0341)
Constant	3.987*** (0.774)	1.145** (0.554)

Number of observations	302	199
Pseudo R-squared	0.183	0.319

*Robust standard errors in parentheses. ***, ** and * stands for significant at 1%, 5% and 10% level, respectively. a) Household wealth index is a standardized first component score generated by factor analysis and composed of following variables: dummy variables for ownership of durables and access to infrastructure (satellite, mobile, motor, TV, toilet, own source of water, electricity) and land size (in ha). b) INR stands for Indian Rupees, 1 INR= 0.017 US\$ as of April 2014*

Despite minor local differences, economic, social and institutional settings of all the sampled households are very similar as data come from villages located relatively close one to each other (approx. 70km radius), all adjoining forests with similar economic and cultural background. Moreover, all data were collected at the same time using similar survey tools, with the identical measures of effects for non-participants and participants of both ED and JFM. Therefore, our study design context complies with criteria for inference from observational studies with low (or no) bias (Heckman et al 1998; Ferraro and Miranda 2014).

MATCHING ALGORITHM AND BALANCE DIAGNOSTICS

We iteratively tested performances of three different matching algorithms for each model: nearest neighbour matching with replacement and 3 neighbours (NNM-n3); NNM-n3 with caliper; and Epanechnikov kernel matching (with band-width=0.06). We checked how each of these three matching algorithms balanced distribution of covariates used in the PS specification to understand if we succeeded in creating plausible counterfactual. Specifically, we examined if 1) matching reduced mean standardized bias for each variable before and after matching; 2) model for the specification of PSs has very low explanatory power after matching; 3) likelihood-ratio tests of joint covariate insignificance are not significant; 4) number of the cases outside of common support region (i.e. dropped treatment observations whose PS is higher than the maximum or lower than the minimum PS of the comparing cases) is low or zero (Sianesi 2004). We run all analyses with the user-written package psmatch2 (Leuven and Sianesi 2003) in Stata12 (StataCorp 2011). For both the models, the NNM-n3

showed the best performance in terms of lowest variance and mean standardized bias after the matching, and the following analysis will be based on the results obtained by this matching algorithm only. Propensity score for H1 was specified using probit model as it had the best matching performances. For H2, logistical regression was selected as it balanced covariates better and had fewer cases outside of support region than a probit model (**Annexes 15** and **16** contain balancing diagnostics for both models).

Results

DESCRIBING THE UNMATCHED SAMPLE

Table 4.3 shows the descriptive statistics of the variables used in the analyses for the unmatched samples.

TABLE 4.3 DESCRIPTIVE STATISTICS FOR UNMATCHED SAMPLES. MEAN VALUES WITH STANDARD DEVIATIONS (SD) IN PARENTHESES ARE SHOWN FOR CATEGORICAL AND CONTINUOUS VARIABLES; AND PERCENTAGE FOR DUMMY VARIABLES

Variable description		Whole Sample (N=302)		Participating households (N=210)		Non-participating households (N=92)		JFM households (N=81)		ED households (N=118)	
		Mean (SD)/ Freq (%)		Mean (SD)/ Freq (%)		Mean (SD)/ Freq (%)		Mean (SD)/ Freq (%)		Mean (SD)/ Freq (%)	
Household level	Household size	5.364 (1.775)		5.295 (1.716)		5.522 (1.901)		5.346 (1.675)		5.229 (1.814)	
	Head gender (1=female)	15.23%		17.14%		10.87%		27.16%***		11.02%***	
	Head formal education level (0=none, 1=1st to 4th grade, 2=5th to 10th, 3=11th to University)	0=45.03% 1=16.89% 2=31.46% 3=6.62%	1 (1.017)	0=47.62 1=14.76% 2=31.43% 3=6.19%	0.962 (1.021)	0=39.13% 1=21.74% 2=31.52% 3=7.61%	1.076 (1.008)	0=44.44% 1=20.99% 2=30.86% 3=3.70%	0.938 (0.953)	0=52.54% 1=10.17% 2=29.66% 3=7.63%	0.924 (1.063)
	Head formal education (1=yes)	54.64%		51.90%		60.87%		55.56%		46.61%	
	Compensated for crop raiding or cattle lifting incidents (at least once) (1=yes)	36.42%		44.29%***		18.48%***		43.21%		48.21%	
	Household wealth index	0.017 (1.013)		0.063** (0.995)		-0.088** (1.052)		0.021 (0.971)		0.104 (0.997)	
	Cash income per capita (1000 INR/person)	0.873 (1.365)		0.917*** (1.396)		0.772*** (1.293)		0.569*** (0.571)		1.201*** (1.749)	
	Livestock ownership (1=yes)	74.83%		77.14%		69.57%		87.65%***		66.1%***	

	Electricity in the household (1=yes)	90.73%		91.90%		88.04%		96.3%**		89.83%**	
	Livestock killed by wild animals (1=yes)	38.08%		35.71%		43.48%		56.79%***		16.1%***	
	Participation in other non-forest related groups (1=yes)	14.90%		15.24%		14.13%		24.69%**		10.17%**	
Community level	Distance to the nearest forested area (in km)	1.340 (0.695)		1.316*** (0.738)		1.395*** (0.584)		1.048*** (0.403)		1.505*** (0.850)	
	Distance to the core zone (1=0-2, 2=2-5, 3=5-14, 4= 14-19 km)	1=28.48% 2=31.46% 3=20.53% 4=19.54%	2.311 (1.086)	1=36.19% 2=37.14% 3=10.48% 4=16.19%	2.066*** (1.056)	1=10.87%, 2=18.48%, 3=43.48%, 4=27.17%	2.869*** (0.940)	2=35.80% 3=27.16% 4=37.04%	3.012*** (0.859)	1=61.02% 2=38.98%	1.390** * (0.489)
Effects	Satisfaction with the PTR authority (1=not at all, 3=neutral, 5=very much) ^{a)}	1=13.58% 2=29.43% 3=19.62% 4=9.43% 5=92%	2.887 (1.201) (N=265)	1=14.36% 2=28.72% 3=17.44% 4=29.74% 5=9.74%	2.918 (1.245) (N=195)	1=11.43%, 2=31.43%, 3=25.71%, 4=28.57%, 5=2.86%	2.8 (1.071) (N=70)	1=7.41%, 2=28.40% 3=18.52% 4=28.40% 5=17.28%	3.198*** (1.239)	1=19.49% 2=28.81% 3=17.80% 4=28.81% 5=5.08%	2.712** * (1.220)
	Trust in the PTR authority (1=not at all, 3=neutral, 5=very much) ^{a)}	1=16.79% 2=28.21 3=17.14 % 4=34.29% 5=3.57%	2.796 (1.184) (N=280)	1=18.23% 2=28.08% 3=14.78% 4=34.98% 5=3.94%	2.783 (1.216) (N=203)	1=12.99%, 2=28.57%, 3=23.38%, 4=32.47%, 5=2.60%	2.831 (1.105) (N=77)	1=11.11% 2=32.10% 3=9.88%, 4=43.21% 5=3.70%	2.963* (1.167)	1=25.42% 2=23.73% 3=15.25% 4=31.36% 5=4.24%	2.653* (1.277)
	Conservation knowledge Score (0-1)	0.352		0.424***		0.189***		0.147***		0.637***	

Like tiger (1=not at all, 3=neutral, 5=very much)	1=2.65% 2=21.19% 3=12.25% 4=61.59% 5=2.32%	3.397 (0.934)	1=3.33%, 2=20.95% 3= 10.48% 4=62.86% 5=2.38%	3.4 (0.955)	1=1.09%, 2=21.74%, 3=16.30%, 4=58.70%, 5=2.17%	3.391 (0.889)	1=3.70%, 2=14.81%, 3=13.58%, 4=61.73%, 5=6.17%	3.519 (0.950)	1=3.39% 2=22.88% 3=6.78% 4=66.95% 5=0%	3.373 (0.95)
Like other wild animals (1=not at all, 3=neutral, 5=very much)	1=3.97% 2=25.17% 3=16.56% 4=51.66% 5=2.65%	3.238 (0.989)	1=4.76%, 2=24.76%, 3=16.19%, 4=51.43%, 5=2.86%	3.229 (1.009)	1=2.17%, 2=26.09%, 3=17.39%, 4=52.17%, 5=2.17%	3.261 (0.948)	1=6.17%, 2=24.69%, 3=20.99%, 4=44.44%, 5=3.70%	3.148 (1.038)	1=4.24% 2=23.73% 3=11.86% 4=58.47% 5=1.69%	3.297 (0.989)
Like forest (1=yes)	98.35%		99.05%		96.74 %		100.00%		98.31%	

***, ** and * refer to likelihood ratio Chi2 tests or Wilcoxon rank-sum tests significant at the 1%, 5% and 10% level respectively when comparing mean values. a) Not pertinent for the overall sample and for the sample of non-participants

In the overall sample, average households size was 5.36 (± 1.775) with 15.23% of female heads. A little over 45% household heads did not have formal education. 38.08% reported that wild animals killed their livestock and 36.42% of the households stated they received compensation (at least once) for a cattle lifting or crop raiding. Household wealth index was low (0.017 ± 1.013). Average monthly cash income was 873INR per person in a household. The majority of families owned livestock (74.83%) and had electricity in their house (90.73%). Only small percentage of households participated in non-forest related groups (14.9%). 59.94% of sampled villages was located within 5km from the core zone. Average village distance to the nearest forested area was 1.34km (± 0.695). Satisfaction and trust towards park authorities was low to neutral (2.9 (± 1.201 ; N=265) and 2.8 (± 1.184 ; N=280) respectively), but majority of non-participants could not give response to these questions. Conservation knowledge was low and the average score was 0.352 out of 1. Biodiversity attitudes were positive: 63.91% of respondents have positive attitudes towards tigers (scores 4 and 5 together), 54.31% have positive attitudes towards other wildlife (scores 4 and 5 together), and 98.35% have positive attitudes towards forests (assigned max score 1; this category was collapsed to 1/0 format as 89.4% participants liked forests i.e. assigned score 4 to the statement).

Participant households had significantly higher household wealth index and the cash income than the non-participant households (no respondents reported ED or JFM to be their primary employment source). Higher percentage of participating households that were compensated for cattle or crop loss, were significantly more distant from a forest and were closer to the PTR core zone. Unmatched sample of participant households had significantly higher knowledge scores (0.434) than the non-participant households (0.189). Other effects were not significantly different.

ED-participant households had significantly smaller percentage of female heads, livestock ownership, livestock kills and lower proportion of participation in non-forest related groups than the JFM-participant households. Significantly, lower number of ED households had electricity. ED-participating households were significantly closer to the core zone; had higher cash income and were more distant from the nearest forested area than JFM households. In the ED participating households satisfaction and trust towards

park authorities was significantly lower and conservation knowledge was significantly higher than in the JFM households. Biodiversity attitudes were not significantly different.

AVERAGE EFFECT OF PARTICIPATION COMPARED TO NO PARTICIPATION (H1)

The only significant difference found between matched participants and non-participants is in conservation knowledge score (0.144, St. Error=0.0517, t-stat=2.78) (Table 4.4). Participant knowledge score was on average low (0.419 out of 1), but still almost two times higher to non-participants knowledge score (0.276).

TABLE 4.4 EFFECT OF PARTICIPATION (IN EITHER ED OR JFM) VERSUS NO PARTICIPATION (H1) FOR FOUR MEASURED EFFECTS (ATT)^A. MEAN DIFFERENCES ARE SHOWN FOR BOTH MATCHED AND UNMATCHED SAMPLES

Variable	Sample	Participants	Non-participants	Difference	Standard Errors	T-stat
Conservation knowledge score (0-1)	Unmatched	0.424	0.189	0.235	0.0377	6.23
	ATT	0.419	0.276	0.144	0.0517	2.78***
Like tiger (1=not at all, 3=neutral, 5=very much)	Unmatched	3.400	3.391	0.009	0.1169	0.07
	ATT	3.410	3.178	0.232	0.1740	1.33
Like other wild animals (1=not at all, 3=neutral, 5=very much)	Unmatched	3.229	3.261	-0.032	0.1239	-0.26
	ATT	3.225	3.023	0.202	0.1848	1.09
Like forest (1=yes)	Unmatched	0.990	0.967	0.023	0.0160	1.45
	ATT	0.990	0.990	0.000	0.0339	0

*** stands for significant at 1% level. a) 10 treated cases (3.3 % of the total sample) were dropped due to a lack of common support and were not included into estimation of the ATT

Differences in conservation attitudes towards tigers, other wildlife and forests were insignificant too, but on average biodiversity attitudes were positive. For participating households, attitudes towards tiger and other wild animals averaged 3.4 and 3.3 (out of 5) respectively. In non-participating households, attitudes towards tiger and other wildlife were somewhat positive and on average insignificantly lower (3.178 and 3.023 respectively). Attitudes towards forests were consistently very positive and in both samples 99% of respondents stated that they like forests.

AVERAGE EFFECTS OF PARTICIPATION IN ED COMPARED TO JFM (H2)

The only significant difference between households participating in ED and JFM in the matched sample (**Table 4.5**) relates to their knowledge about conservation. Here the difference is even higher than the one from H1 (mean=0.411, St. Error=0.0562, t-stat=7.3). Average knowledge score of ED participating households was relatively high (0.633), while the one of JFM-participating households was almost three times lower (0.222).

TABLE 4.5 EFFECT OF HOUSEHOLD PARTICIPATION IN ED VERSUS PARTICIPATION IN JFM (H2) FOR MEASURED EFFECTS (ATT)^{A)}. MEAN DIFFERENCES ARE SHOWN FOR BOTH MATCHED AND UNMATCHED SAMPLES

Variable	Sample	ED-participating households	JFM-participating households	Difference	Standard Errors	T-stat
Satisfaction with the PTR authority (1=not at all, 3=neutral, 5=very much)	Unmatched	2.712	3.198	-0.486	0.1772	-2.74
	ATT	2.723	3.179	-0.455	0.3214	-1.42
Trust in the PTR authority (1=not at all, 3=neutral, 5=very much)	Unmatched	2.653	2.963	-0.310	0.1780	-1.74
	ATT	2.661	2.923	-0.262	0.3125	-0.84

Knowledge score (0-1)	Unmatched	0.637	0.147	<i>0.490</i>	0.0309	15.84
	ATT	0.633	0.222	<i>0.411</i>	0.0562	7.3***
Like tiger (1=not at all, 3=neutral, 5=very much)	Unmatched	3.373	3.519	<i>-0.146</i>	0.1371	-1.06
	ATT	3.438	3.476	<i>-0.039</i>	0.2465	-0.16
Like other wild animals (1=not at all, 3=neutral, 5=very much)	Unmatched	3.297	3.148	<i>0.148</i>	0.1457	1.02
	ATT	3.295	3.042	<i>0.253</i>	0.2521	1
Like forest (1=yes)	Unmatched	0.983	1.000	<i>-0.017</i>	0.0144	-1.18
	ATT	0.982	1.000	<i>-0.018</i>	0.0126	-1.42

*** stands for significant at 1% level. a) 6 cases (3% of the total sample) were dropped from this comparison due to the lack of common support and were not included into estimation of the ATT

JFM-participating households were slightly (but insignificantly) more satisfied and trustworthy towards the PTR authorities, however those differences in satisfaction (0.455, St. Error=0.321, t-stat=1.42) and trust (0.262, St. Error 0.312, t-stat=0.84) towards tiger reserve authorities were not statistically significant.

As for the case of H1, attitudes towards forest, tiger and other wildlife were positive and negligibly higher with JFM-participating households, but these differences were not statistically significant.

Discussion

DO LOCAL PEOPLE'S CONSERVATION KNOWLEDGE AND BIODIVERSITY ATTITUDES DIFFER BETWEEN PARTICIPANTS AND NON-PARTICIPANTS?

We found that participation in either of the programmes (H1) only had an effect on the level of conservation knowledge, but did not affect biodiversity attitudes. Furthermore, the magnitude of the effect was low as knowledge about conservation and park's regulations, existence and location were relatively weak in the matched subsamples. Perhaps our results reflect the lower funding currently invested in the projects. Lower

conservation awareness concurs with other research, also reporting that knowledge was found to be inversely associated to a residence distance from a PA (Ormsby and Kaplin 2005; Olomí-Solà et al 2012).

Although most respondents live in the buffer zone, they could not define the buffer zone, and only 20.95% participants and 10.87% non-participants could actually provide any answer. Administrative changes connected to the buffer zone created a lot of confusion as locals thought that they would be relocated (interview with the local villager, Pench Tiger Reserve- buffer, February 2014). Moreover, according to our interviewees, confusion about the operational rules and regulations in the buffer zone existed also among the PTR officers (Interview with the forest officer, Pench Tiger Reserve -core, March 2014). To decrease the potential escalation of the local conflicts, more efforts should be directed towards awareness campaigns in all the villages surrounding the buffer.

Although we found no significant difference between the two matched samples, our data shows that attitudes towards biodiversity were on average positive, despite the high costs incurred to locals due to constant incidences of crop riding and cattle lifting (reported by 79.47% and 38.08% sampled households respectively). These are encouraging results as high locally borne costs were found to negatively influence wildlife attitudes in other locations (Heinen and Shrivastava 2009; Carter et al 2014).

Interestingly, prevalent perception among interviewees is that crop riding intensified as well as number of wild animals due to good protection and enforcement and banned resource extraction. So there is a trade off between conservation and human livelihoods. ED provisions are perceived not to be sufficient to offset these big costs connected to both access restriction and agricultural losses (ED committee member, February 2014, Pench Tiger Reserve-buffer). This every-day fight for subsistence does not allow free time for any other activities (including participation in ED or JFM meetings) (forest villager, January, 2014, Pench Tiger Reserve-buffer).

Perhaps more should be invested in the compensatory measures or awareness about villagers' rights to compensation. Majority of interviewees, both ED committee

members and other villagers, complained about lack of compensation. However, interviewees did not know who is responsible for giving compensation, and they usually stopped asking for it after several failed attempts. Park gives compensation only for cattle lifting by wildlife, but revenue department is responsible for crop raiding compensations in revenue villages. However, revenue department was perceived to be very slow in following the procedure for damage assessment and paying the costs back. Nevertheless, this situation also creates dissatisfaction with the Forest Department, as there is a frequent misconception that they are in charge for such compensation. Recently, government of Madhya Pradesh enacted Public Service Guarantee Act, 2010 increasing efficiency of public administration and regulating the response of public servants to general public within 30 days. This should have increased response rate for the compensation but local people are unaware of these changes and they are very frequently stating how they stopped applying for the compensation after so many failed attempts (group Interview with villagers, February 2014, Pench Tiger Reserve-buffer). Finally, compensation is provided only if the damage area is above 1 acre, which does not have much sense for small farmers (whole field can be 1 -2 acres) (group interview with villagers, March 2014, Pench Tiger Reserve-buffer).

DOES THE TYPE OF PARTICIPATORY INTERVENTION - JFM OR ED – MATTERS IN TERMS OF PEOPLE’S CONSERVATION KNOWLEDGE, BIODIVERSITY ATTITUDES, TRUST AND SATISFACTION WITH THE MANAGEMENT AUTHORITIES?

We found no difference between the ED and JFM participating households (H2) except in the level of conservation knowledge. According to our hypothesis, ED households have higher levels of knowledge than the JFM participating households. This finding can be explained, not only by the ED project activities, but also by the core zone proximity. Namely, while testing H2, we could not control for the distance to the core as this variable perfectly predicted participation. This can mean that higher awareness of the local forest-dependent dwellers perhaps come with the higher dependence on the park and more frequent (perhaps unwanted) encounters with the park staff, rather by the ED project activities only.

When asked about the trust and satisfaction with the park authorities, ED-participating households assigned lower scores compared to the JFM households, but these differences were not statistically significant. Overall, participants of ED and JFM were moderately unsatisfied to ambivalent towards PTR authorities. Slightly lower scores were assigned to the statements on trust towards PTR authorities. Low level of compensation rates and the sense of extended Forest Department control through ED or JFM committees (Véron and Fehr 2011) might explain moderate distrust of locals towards Reserve stewards. Low level of interactions with the local people and low awareness of the park might also be a plausible explanation for the ambivalence regarding satisfaction, as our first finding suggests.

We can interpret some of these results in the light of the design of participatory policies. Both, the JFM and ED are designed as participatory programmes, but still, they are implemented in a very top-down way. The idea that authoritarian governmental departments are placed in charge to implement participatory strategies (Guha 1997) was not proven to lead to long-lasting legacy of such projects (Gubbi et al 2009). According to Vemuri (2008) attitudinal changes of FD staff to prepare for policy that advocates social inclusion into hierarchical system of forest management did not happen. This concurs with our field observation that villagers from our sample identify ED project with the actual FD; furthermore, ED is seen as one more way of control of the forest access. Scholars have interpreted such types of participatory projects as a state-driven territorialisation (Véron and Fehr 2011) and recentralizing while decentralising (Ribot et al 2006). Therefore, the imposed participation (if any) and top-down decentralization seems to have failed in creating better rapport between locals and the Reserve authorities. This is reflected in the projects' functioning as well. Namely, meetings, as arenas to negotiate and make decisions, in both JFM and ED, are nowadays non-existent or very rare (once or twice per year), as perhaps there is neither interest nor time for participation. Moreover, benefits and provisions under ED once abundant (with the bigger funding) are now very rare. This creates frustration due to raised expectations. When provisions are distributed (once per year/two years) internal conflicts are frequent among local people, as there are not enough provisions for everyone in the village (e.g. 10 gas cylinders per a village of 300 households). On the other hand, local demands (for example, for fences against crop raiding) are frequently not fulfilled. EDC members are

in-between local people and FD and so, they are often blamed for unfulfilled demands and unequal benefits distribution, which may create intra-community conflicts. Giving incentives can change people's values (García-Amado et al 2013) and if not executed properly, incentive-based conservation can exaggerate local conflicts and existing differences, prompting the elite capture, excluding poor and marginalized parts of the society (Balooni et al 2010) rather than creating positive behavioural changes towards conservation.

STUDY LIMITATIONS

Despite careful design, our study might suffer from different sources of bias. As with every matching, our results are dependent on the PS model specification and observed covariates. When alternating model specifications, our results remained robust, except tiger attitudes variable that was changing significance for H1-related model. We might not be aware and might not include all the covariates that simultaneously influence the participation and the measured effects. We did not have the baseline data and collected recall data did not seem reliable enough to precisely capture the past. Our assessment is based on the respondents' perceptions that might be interpreted as less objective data. Nevertheless, we believe that conservation knowledge, being built of 7 different questions, represents a robust indicator of "cognitive difference" between participants (both ED and JFM) and non-participants. Measured attitudes are less robust, but are still a valid assessment of (current) relations among local people, surrounding biodiversity and resource stewards (White et al 2009). Finally, interviewees tend to give socially desirable answers and we might have over- or under-reported the results. Nevertheless, we have taken all the necessary measures to gain interviewees' trust (we clearly explained research objectives, guaranteed and respected confidentiality and anonymity, asked sensitive questions using neutral wording), so they feel more comfortable expressing their genuine opinions.

Conclusions

According to recent tiger census from 2014 (Jhala et al 2015) tiger numbers increased in India for 30.5% (with increase recorded in Madhya Pradesh). However, threats to wild tigers are still intensifying (Wikramanayake et al 2010) especially outside of PA

networks, and lessons learned from evaluations of interventions that may affect conservation success around tiger reserves can be critical for the effective tiger conservation. Due to lack of space for both tigers and humans, this increase in tiger numbers will also mean more human –wildlife conflicts (Rastogi et al 2012), so there is a need to understand which people-centred approaches to conflict resolution have a positive impact.

In spite of huge investments during the WB/GEF project, this study found negligible effect of participation in the two state-driven forest conservation and management projects on local people knowledge, and there were no effects on the attitudes towards biodiversity. Moreover, the type of the project also did not seem to make a difference for people’s attitudes, satisfaction and trust towards reserve stewards, except for the conservation knowledge. These findings might be due to the low amount of current funding flows in ED, or lack of genuine participation and no decision-making power vested in local people. The exact role and effectiveness of participation (in state-driven decentralization models) for improvement of long-term conservation outcomes remains yet to be clarified with future research incorporating measures of ecological outcomes in the evaluations. Nevertheless, our findings suggest that the participatory rhetoric of the policies has to translate into the practice first, as practitioners need to understand that the genuine social inclusion may be necessary for the sustainability of long-lasting efforts for tiger survival (Tiger Task Force 2005). More genuine, grass-root and not imposed participation, combined with awareness campaigns, higher and targeted compensation, carefully listening to local needs and incorporating local opinions in the management planning, are all needed to build local social capital and increase people’s interest in conservation, their knowledge and trust towards conservation practitioners. Finally, local context and existing power relations has to be accounted for in participatory efforts, as no simple blueprint approaches are proven to lead to conservation success.

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CHAPTER 5

ADVANCING ANALYSIS AND EVALUATION OF CONSERVATION POLICY AND PRACTICE

The traditional natural resource governance has been neglecting the complexity of coupled social and ecological systems and proposing simple solutions or panaceas for problems in natural resource management, imposing one limited set of resource institutions dealing with conservation dilemmas (Gibson et al., 2004). The most frequent prescription in conservation was a public property right (e.g. denomination of state national parks to protect biodiversity). This simplistic solution is argued to lead to failure of governance arrangements when applied to diverse settings, also because problems rarely stem from a single cause (Ostrom 2007). Moreover, the blueprint approach (i.e. assigning state-run protected areas regardless of local conditions) tends to simplify complexity of natural systems, which has a negative impact to viability and robustness of such systems (Cox 2011). The motivation for this research is threefold: first to understand the knowledge gaps in the links between conservation outcomes and governance at a global scale; second to understand the changing role of the state in conservation; and third, to understand the effect of participation in the state-driven decentralization programmes

Several relevant lessons, for both policy and practice, can be derived from this research. Following three main objectives (to collate evidence on the changing role of governance in forest protected areas globally (**Chapter 2**); to analyse the potential shift from hierarchical to collaborative governance in the case example of tiger conservation (**Chapter 3**); 3) to evaluate inclusive policies and their implementation through state-driven decentralization programmes on the ground (**Chapter 4**), below are presented main results that are explained in the context of wider protected area literature.

Hierarchical state-governed PAs and their simple governing norms and prescriptions are now well understood in the literature (Lockwood 2010), but once there is a shift to multi-actor governance, involving diverse state and non-state actors, with various level of power sharing, the understanding of the interacting governance components is often

blurred by its overall complexity. There are still many methodological constraints in discerning causal effects between conservation intervention and outcomes (Ferraro & Pattanayak 2006; Nolte et al. 2013; Ferraro & Hanauer 2014; Baylis et al. 2015), there are still lessons to be learned from the current evidence base.

The first part of this dissertation catalogued existing evidence on the role of diverse governance arrangements in the effectiveness of forest PAs. The produced systematic map collated evidence based on four outcome categories: attitudinal, behavioural, ecological and spill-over effects. Evidence gaps are mapped in this literature and the quality and the quantity of the current evidence base described. Although there seems to be an increase in the research on governance in conservation (**see Figure 2.2.3 - Chapter 2**), the current evidence base is fragmented and small, in terms of geographical width, quantity and quality which coincides with results from other systematic reviews on natural resource governance (Bowler et al. 2010; Geldmann et al. 2013; Pullin et al. 2013; Samii et al. 2014).

However, researchers frequently do not sufficiently describe PA governance when evaluating PA effectiveness or measuring conservation outcomes. They often disregard mentioning who the main actors are, how is power shared among them and who is accountable. With this observation, this study highlights the frequent failure of conservationists to acknowledge the connections between conservation outcomes and the local institutional and political setting (Brechin et al. 2002).

The complexity of relations between ecological and social layers of FPAs, is further simplified by looking only at the ecological side of conservation success. The majority of mapped studies focus only on one outcome, predominantly ecological. Local peoples' attitudes and behaviour, conditional upon different governance modes, are less represented in the mapped literature. Focusing only on ecological outcomes can obscure information on local conflicts, the level of compliance and the trust relationship between local people and managers. In this way the role of governance in FPA effectiveness is only partially understood. This understanding is frequently contingent on the imposed (by scientists) and limited understanding of conservation success (Murray 2005; Axford et al. 2008; Brechin et al. 2010; Granderson 2011).

The systematic mapping of studies measuring spill-over effects in connection to different FPAs under different governance modes could not be adequately performed with the available literature. This is not surprising as measuring spill-over effects require strong baseline data that is frequently not available in conservation setting (Ferraro & Pattanayak 2006). Planning the impact assessment exercise already in the project-writing phase and measuring baseline data before conservation project has to be established (Baylis et al. 2015). Furthermore, studies that measured how FPAs affect surrounding social-ecological systems either did not include enough information on governance modes or they did not provide a relevant comparator, which prevented the linking of these two variables for this research

Conservation funding is frequently restricted and policy makers and funding agencies have to know what works and under which circumstances, therefore it is important to improve effectiveness toolbox (Ferraro & Pattanayak 2006). Numerous scientists are calling for the application of impact evaluation in nature conservation (Miteva et al. 2012; Ferraro & Hanauer 2014; Baylis et al. 2015). Rightly so, because the map reflects poor methodological tools that researchers currently use to evaluate conservation effectiveness. They usually lack counterfactual logic and do not apply appropriate and robust study designs that can assure attribution of the intervention to the effect.

This work further underlines the complexity of governance arrangements and difficulties of primary research to discern and clearly isolate one effect over the other, even with the best methodology available. Proof of this complexity is the difficulty in collating and cataloguing of evidence within a diverse governance-related research without common definitions and vast “background noise” (i.e. effect-modifiers). The same problem is already recognised in evidence synthesis of complex interlinked interventions in the field of health service research (e.g.: Pawson et al. 2005; Shepperd et al. 2009) and these reviewers offer guidelines that could be applicable and adapted to the conservation context.

The complexity further increases as we scale up from isolated protected areas to wider landscapes. Achieving ecological connectivity within landscapes often needs to be supported by vertical and horizontal connectivity between institutions, actors and ecological entities (Kininmonth & Bergsten 2015). Understanding of the alignment

between ecological and social processes is therefore of immense importance for the sustainable conservation outcomes (Folke et al. 2005; Garmestani & Benson 2013). Here, collaboration and coordination between actors become a central to the question of governance (Kallis et al. 2009). The changing role of the park agencies with the “exclusionary and sectoral” mentality is therefore critical for this shift.

The second set of findings in this dissertation analyse the potential for a change from isolated PA-centric towards landscape-scale tiger conservation in central India. This shift would imply change in current governance structures to achieve the “fit” between social and ecological part of the system (Young 2002). This work finds that a mix of interlinked institutional and cognitive factors might be an obstacle to governance change and collaboration between different landscape actors. In spite of changes in policies that call for greater participation, decentralized and livelihoods-oriented natural resource management, in the analysed case-study, (very centralized, State-driven decision making) conservation on the ground is perceived to retain strong “fortress” configuration. The organisational structure of the implementing state agencies in the central Indian landscape (state forest departments of Madhya Pradesh and Maharashtra) was perceived to be the reason for persistence of fortress conservation. As in other similar studies in the same context (Kumar & Kant 2006; Sood & Gupta 2007), colonial legacies embedded in the working culture and values of park manger visible through their urge to retain the territorial power, is perceived to affect their potential for collaboration with other landscape actors (in this case, local people and NGOs). This could affect the shift from centralised-management to collaborative management (government to governance) of the PA potentially difficult. The organisational structure and culture of park managers have already been analysed in context of decentralised forest management (Matta et al. 2005; Kumar & Kant 2006; Lawrence 2007), but they have been often forgotten in biodiversity conservation (for Indonesian park see: Kubo & Supriyanto 2010) and this dissertation contributes to fill this knowledge gap. A further analysis of interactions between the park managers and other landscape actors (NGOs, scientists, and local communities) identified a lack of trust and information flow to be an impediment for better social connectivity. Differences in value frames and pre-established power imbalances across actors are also perceived to constrain collaboration and consensus building (also in: Bryson et al. 2006; Mostert et al. 2007).

Following analysis of the wider governance system, this research focused on both the regional and the local level. Two participatory incentive-based projects around the Pench Tiger Reserve in Madhya Pradesh, India were evaluated through differences in conservation knowledge, biodiversity attitudes, and institutional trust. In the context of state-driven decentralization, the work focused on assessment of integrated conservation and development project (known under name eco-development (ED)) and a form of collaborative forest management – Joint Forest Management (JFM). This study found only weak causal links between participation in both projects on local people conservation knowledge. People’s attitudes towards biodiversity are found to be independent of any kind of participation. Results were the same when effects of the participation were compared between the two projects. Additional outcome measured – trust towards implementing agency¹⁴ – was not significantly different between the two projects either. These results that might be interpreted as “money for nothing”¹⁵ correspond to the findings in the previous chapter of this dissertation and other literature on the ecodevelopment evaluation (Arjunan et al. 2006; Gubbi et al. 2009; Dejouhanet 2010). Namely, ED in India was conceived as an idea that departs from exclusionary conservation logic, where interests of local people should be taken into account to offset people-wildlife conflict (Das 2011). However, in the actual implementation of the ecodevelopment, the only focus was weaning people away from protected areas. Local people were seen only as “beneficiaries” and “participation” meant provision of household benefits, rather than inclusion in the meaningful decision making (Woodman 2002). Moreover, the meaning of participation is frequently interpreted differently to serve the particular purpose of the implementing (state) agencies or donors (Cooke & Kothari 2001; Das 2011). This in turn is counter-productive for conservation in the long run (Das 2011).

Directions for future research

Apart from contributing to knowledge gaps throughout 3 data chapters, this dissertation left many open questions for the future research.

¹⁴ Madhya Pradesh Forest Department

¹⁵ Ferraro and Pattanayak (2006)

The study only implicitly draws on the issues of governance scale. Ecological and social scale differ, which challenges evaluation of environmental and conservation governance (Bruyninckx 2009). New governance arrangements are often functioning in cross-scale interactions (e.g. between different actors at local, national or international levels). Understanding of these linkages is left to be completed in the future research.

Systematic map (**Chapter 2.2**) can serve as start for several full systematic reviews by breaking down elements of the systematic map question. This research could continue with reviewing and extracting evidence on the role and effectiveness of each governance type separately using the map as a basis with update of the search, full critical appraisal, data extraction and synthesis.

Moreover, mapping left open several primary research questions. For example, there is no sufficient and reliable evidence on the effectiveness of private protected areas on the ecological and social outcomes (see **Chapter 2.2**). This is important conservation question, having in mind that the designation of such protected areas is voluntary and their long term security is at stake (Dudley 2008).

The map findings pointed to lack of the research on spill-over effects contingent to governance type of FPAs. This is one of the important areas for the future research as spill-over effects might bias estimate of the real conservation impacts (through leakage effect or confounding control area)(Baylis et al. 2015).

Governance of FPAs is complex, with various actors, management practices, tenure regimes, funding sources (Borrini-Feyerabend et al. 2013). Moreover, systematic reviews in environmental management and conservation do not seem to have developed methodology for assessing such heterogeneity. Development of systematic review methodology in this direction might be needed. Some advancements on evidence synthesis of complex interventions in medicine (Shepperd et al. 2009) might be helpful initial guidance for evidence synthesis in governance of natural resources.

Exploring ecological outcomes of the participatory interventions and painting the complete picture on the effects of participatory interventions in the context of state-

driven decentralization would be also needed to obtain more robust results of the evaluation conducted in this research.

Some argue that conservation attitudes do not lead to conservation oriented behaviour (Karanth et al. 2008) so for the future research on the effects of participatory policies, there is a need to study conservation behaviour to better understand the effects of the participation on local people. This could be estimated through self-reported behaviour or a study of behavioural intentions as a proxy to actual behaviour (see: St John et al. 2010).

In context of top-down exclusive conservation depicted in **Chapter 3** of this dissertation, people-park conflicts are frequent because of limited conservation space and resources, incompatible interests, unequal power and benefit flows between local people and natural resource managers (Rastogi et al. 2012). In such context, local community trust towards park management authority can be an important source of legitimacy and voluntary compliance with the park rules (Stern 2008). Moreover, trustworthy relationship is a precondition for collaboration (Baral & Heinen 2007; Bouma et al. 2008; Stern & Coleman 2014), which is at hearth of landscape level conservation. This research has not paid sufficient attention to institutional trust and in-depth analysis would be needed to gain a deeper collaborative potential for landscape level conservation.

Given the complexity of coupled social and ecological systems and embedded FPAs, it would have been impossible to cover all the aspects of their governance. This research sheds light on some important facets of this complexity, but, as shown, it also opens space for further investigation and advancement.

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ANNEXES

ANNEX 1: SCOPING EXERCISE, SEARCH STRING DEVELOPMENT AND FINALIZED SEARCH STRING

13.7.2012		
Timespan=All Years. Search language=English Lemmatization=Off		
ALL KEYWORDS management, governance, social, ecological outcomes and attributes of governance	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "state" OR "governme*" OR "public" OR "commun*" OR "indigenous" OR "jfm" OR "joint forest management" OR co\$manag* OR "collaborative" OR "decentrali*" OR "devolut*" OR "delegat* authority" OR "integrat* conservation development" or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument" OR "wilderness area*" OR "world heritage site*" or "biocultural Heritage Site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or spill\$over* or "reforest*" or "afforest*" or re\$growth or "loss*") AND ("participat*" or "accountab*" or "legitima*" or, "monitor*" or "report*" or "compliance" or "enforcement*" or "coercion*" or "trust*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*")	230
Doesn't give any returns - DELETED	"biocultural Heritage Site*"	
Doesn't give any returns - DELETED and REPLACED by delegat* authorit*	"delegat* authority"	
Doesn't give any returns - DELETED and REPLACED by	"integrat* conservation development"	

("integrated conservation and development")		
Deleted as it is not present in Protected areas, JFM hasn't returned any hits	"jfm" OR "joint forest management"	
now: "monument"	"monument"	
now: "managed resource"	"managed resource"	
now: ("spillover" or "spill-over")	spill\$over*	
doesnt give any returns, now: (comanag* or co-manag*)	comang	
now: (re-growth or regrowth)	re\$growth	
	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "state" OR "public" OR "commun*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or ("spillover" or "spill-over") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*") AND ("participat*" or "accountab*" or "legitima*" or "monitor*" or "report*" or "compliance" or "enforcement*" or "coercion*" or "trust*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*")	231
samo eco	Topic=((("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "state" OR "public" OR "commun*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR	Approximately 6,245

	<p>"decentrali*" OR "devolut*" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*"))</p> <p>Timespan=All Years. Search language=English Lemmatization=Off</p>	
w/o LOSS	<p>Topic=((("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "state" OR "public" OR "commun*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth))))</p> <p>Timespan=All Years. Search language=English Lemmatization=Off</p>	Approximately 5,665
socio (w.o eco) + attributes	<p>("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "state" OR "public" OR "commun*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("participat*" or "accountab*" or</p>	624

	“legitima*” or “monitor*” or “report*” or “compliance*” or “enforcement*” or “coercion*” or “trust*” AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*”)	
w/o eco and attributes, samo socio	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “state” OR “public” OR “commun*” OR “indigenous” or (comanag* or co-manag*) OR “collaborative” OR "decentrali*” OR “devolut*” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “polit*” or “polic*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*”)	Approximately 2,395
samo socio	((“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*”))	Approximately 5,967
	UMESTO “JFM” or “joint forest management” stavi “joint management” to account for collaborative management	
18.7.2012		
	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “state” OR “public” OR “commun*” OR “indigenous” or (comanag* or co-manag*) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “polit*” or “polic*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“deforest*” or “degrad*” or “biodiversity” or “decline*” or desert* or “threaten” or “leakage*” or ("spillover*" or "spill-over*") or “reforest*” or “afforest*” or (re-growth or regrowth) or “loss*”) AND (“participat*” or “accountab*” or “legitima*” or, “monitor*” or “report*” or	231

	"compliance" or "enforcement*" or "coercion*" or "trust*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*")	
	((("governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*")) AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")) AND ("participat*" or "accountab*" or "legitima*" or, "monitor*" or "report*" or "compliance" or "enforcement*" or "coercion*" or "trust*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*"))	123
BANGOR PROXY: >16000 hits!! lemmatization on	Topic=("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "state" OR "public" OR "commun*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")) Timespan=All Years. Search language=English Lemmatization=Off	approx 6,249 = 6,086
		FINALLY 9,070
Change commun to community conserved areas	("STATE" OR "NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "public" OR "community conserved area*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated	Approxim ately 9,242

	and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")	
delete state	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "public" OR "community conserved area*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or "decline*" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")	Approximately 6,848 finally: 3,609
delete decline	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "public" OR "community conserved area*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")	LEMMA T I Z A T I O N O F F Approximately 6,175 finally: 3,272
add "paper park*"	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "public"	Approximately

	OR "community conserved area*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*" or "paper park*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")	6,187 finally: 3,276
delete public	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "community conserved area*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*" or "paper park*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")	Approxim ately 5,201 finally:2,7 68
ADDED socio/attributes	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "community conserved area*" OR "indigenous" or (comanag* or co-manag*) OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*" or "paper park*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*")	180

	<p>“afforest*” or (re-growth or regrowth) or “loss*”) AND (“participat*” or “accountab*” or “legitima*” or, “monitor*” or “report*” or ”compliance” or “enforcement*” or “coercion*” or “trust*”) AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*”)</p>	
<p>put gov attributes with (OR) under governance</p>	<p>("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “community conserved area*” OR “indigenous” or (comanag* or co-manag*) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “polit*” or “polic*” or “paper park*” OR “participat*” or “accountab*” or “legitima*” or, “monitor*” or “report*” or ”compliance” or “enforcement*” or “coercion*” or “trust*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“deforest*” or “degrad*” or “biodiversity” or desert* or “threaten” or “leakage*” or ("spillover*" or "spill-over*") or “reforest*” or “afforest*” or (re-growth or regrowth) or “loss*”) AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*”)</p>	866
<p>put together attributes and attitudes/behavior</p>	<p>("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “community conserved area*” OR “indigenous” or (comanag* or co-manag*) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “polit*” or “polic*” or “paper park*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“deforest*” or “degrad*” or “biodiversity” or desert* or “threaten” or “leakage*” or ("spillover*" or "spill-over*") or “reforest*” or “afforest*” or (re-growth or regrowth) or “loss*”) AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*” OR “participat*” or</p>	1148

	“accountab*” or “legitima*” or, “monitor*” or “report*” or ”compliance” or “enforcement*” or “coercion*” or “trust*”))	
only governance and management	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “community conserved area*” OR “indigenous” or (comanag* or co-manag*) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “polit*” or “polic*” or “paper park*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest*)	Approximately 11,927
addedd power	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “community conserved area*” OR “indigenous” or (comanag* or co-manag*) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “polit*” or “polic*” or “power” or “paper park*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“deforest*” or “degrad*” or “biodiversity” or desert* or “threaten” or “leakage*” or ("spillover*" or "spill-over*") or “reforest*” or “afforest*” or (re-growth or regrowth) or “loss*”) AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*” OR “participat*” or “accountab*” or “legitima*” or, “monitor*” or “report*” or ”compliance” or “enforcement*” or “coercion*” or “trust*”))	1,206 no decreased. ..
addedd “” to comanagement	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “community conserved area*” OR “indigenous” or (“comanag*” or “co-manag*”) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “polit*” or “polic*” or “paper park*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage	1,148 = no change!!

	site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*" OR "participat*" or "accountab*" or "legitima*" or, "monitor*" or "report*" or "compliance" or "enforcement*" or "coercion*" or "trust*"))	
add conservation	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "community conserved area*" OR "indigenous" or ("comanag*" or "co-manag*") OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "polit*" or "polic*" or "paper park*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("conserv*" or "deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*" OR "participat*" or "accountab*" or "legitima*" or, "monitor*" or "report*" or "compliance" or "enforcement*" or "coercion*" or "trust*"))	1793
add rules, norms	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "community conserved area*" OR "indigenous" or ("comanag*" or "co-manag*") OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "rule*" or "norm" or "polit*" or "polic*" or "paper park*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("conserv*" or "deforest*" or "degrad*" or "biodiversity" or	1862

	desert* or “threaten” or “leakage*” or ("spillover*" or "spill-over*") or “reforest*” or “afforest*” or (re-growth or regrowth) or “loss*”) AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*” OR “participat*” or “accountab*” or “legitima*” or “monitor*” or “report*” or ”compliance” or “enforcement*” or “coercion*” or “trust*”)	
added * to account for norm	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “community conserved area*” OR “indigenous” or (“comanag*” or “co-manag*”) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “rule*” or “norm*” or “polit*” or “polic*” or “paper park*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“conserv*” or “deforest*” or “degrad*” or “biodiversity” or desert* or “threaten” or “leakage*” or ("spillover*" or "spill-over*") or “reforest*” or “afforest*” or (re-growth or regrowth) or “loss*”) AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*” OR “participat*” or “accountab*” or “legitima*” or “monitor*” or “report*” or ”compliance” or “enforcement*” or “coercion*” or “trust*”)	1998
w/o ecological impacts	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR “privat*” OR "governme*” OR “community conserved area*” OR “indigenous” or (“comanag*” or “co-manag*”) OR “collaborative” OR "decentrali*” OR “devolut*” OR “joint management” OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or “governance” or “institution*” or “rule*” or “norm*” or “polit*” or “polic*” or “paper park*”) AND (“protected area*” OR “reserve*” OR park* OR “monument*” OR “wilderness area*” OR “world heritage site*” or “sanctuar*” or “refug*” or “biosphere reserve*” or “protected landscape” or “managed resource*” or “sacred forest*” or “sacred grove*”) AND forest* AND (“attitude*” or “behavi*” or “perception*” or “belief*” or “perspective*” or “opinion*” or “view*” OR “participat*” or “accountab*” or “legitima*” or “monitor*” or “report*” or ”compliance” or “enforcement*” or “coercion*” or “trust*”)	Approximately 6,007= Results: 3,274

odvojeno attributes i nema ecological attributes	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "community conserved area*" OR "indigenous" or ("comanag*" or "co-manag*") OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "rule*" or "norm*" or "polit*" or "polic*" or "paper park*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*" OR "participat*") and ("accountab*" or "legitima*" or "monitor*" or "report*" or "compliance" or "enforcement*" or "coercion*" or "trust*")	: 482
attributes with governance	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "community conserved area*" OR "indigenous" or ("comanag*" or "co-manag*") OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation and development") or "ICDP*" or "governance" or "institution*" or "rule*" or "norm*" or "polit*" or "polic*" or "paper park*" OR "participat*" or "accountab*" or "legitima*" or "monitor*" or "report*" or "compliance" or "enforcement*" or "coercion*" or "trust*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("conserv*" or "deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*")	1,610 very good articles
w/o attributes	("NGO*" OR non\$governmental organi\$ation OR "private nature reserve*" OR "privat*" OR "governme*" OR "community conserved area*" OR "indigenous" or ("comanag*" or "co-manag*") OR "collaborative" OR "decentrali*" OR "devolut*" OR "joint management" OR (delegat* AND authorit*) OR ("integrated and conservation	1005

	<p>and development") or "ICDP*" or "governance" or "institution*" or "rule*" or "norm*" or "polit*" or "polic*" or "paper park*") AND ("protected area*" OR "reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "managed resource*" or "sacred forest*" or "sacred grove*") AND forest* AND ("conserv*" or "deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or (re-growth or regrowth) or "loss*") AND ("attitude*" or "behavi*" or "perception*" or "belief*" or "perspective*" or "opinion*" or "view*")</p>	
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ANNEX 2: DATABASE SEARCH WITH DIFFERENCES IN SEARCH STRINGS ACCORDING TO DB SEARCH FACILITY

Total downloaded	Database	URL	Search 1	Search 2	Search 3
Search date: 2.11.2012					
2000	Scopus	http://www.scopus.com	TITLE-ABS-KEY("governance" OR "self-governance" OR "institution*" OR "rule*" OR "norm*" OR "polit*" OR "polic*" OR "paper park*" OR "participat*" OR "accountab*" OR "legitima*" OR "compliance" OR "enforcement*" OR "coercion*" OR "trust*" OR "conflict*" OR "exclusion*" OR "access" OR "local elite*" OR "elite capture") AND ("protected area*" OR "nature reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" OR "sanctuar*" OR "refug*" OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND forest* AND ("conserv*" OR "deforest*" OR "degrad*" OR "biodiversity" OR desert* OR	("protected area*" OR "nature reserve*" OR park* OR monument* OR "wilderness area*" OR "world heritage site*" OR sanctuar* OR refug* OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND (governance OR self-governance OR institution* OR rule* OR norm* OR polit* OR polic* OR "paper park*" OR participat* OR accountab* OR legitima* OR compliance OR enforcement* OR coercion* OR trust* OR conflict* OR exclusion* OR access OR "local elite*" OR "elite capture") AND forest* AND (conserv* OR deforest* OR degrad* OR biodiversity OR desert* OR threaten OR leakage* OR spillover* OR spill-over* OR	TITLE-ABS-KEY(("protected area*" OR "nature reserve*" OR park* OR monument* OR "wilderness area*" OR "world heritage site*" OR sanctuar* OR refug* OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND (governance OR self-governance OR institution* OR rule* OR norm* OR polit* OR polic* OR "paper park*" OR participat* OR accountab* OR legitima* OR compliance OR enforcement* OR coercion* OR trust* OR conflict* OR exclusion* OR access OR "local elite*" OR "elite capture") AND forest* AND (conserv* OR deforest* OR degrad* OR biodiversity OR desert* OR threaten OR leakage* OR spillover* OR spill-over* OR reforest* OR

			"threaten" OR "leakage*" OR "spillover*" OR "spill-over*" OR "reforest*" OR "afforest*" OR "re-growth" OR "regrowth" OR "forest clearance" OR "land use change" OR "land cover change" OR "loss*" OR "attitude*" OR "behavi*" OR "perception*" OR "belief*" OR "perspective*" OR "opinion*" OR "view*"), 27950 hits, refine search	reforest* OR afforest* OR re-growth OR regrowth OR "forest clearance" OR "land use change" OR "land cover change" OR loss* OR attitude* OR behavi* OR perception* OR belief* OR perspective* OR opinion* OR view*), 78072 hits, refine search	afforest* OR re-growth OR regrowth OR "forest clearance" OR "land use change" OR "land cover change" OR loss* OR attitude* OR behavi* OR perception* OR belief* OR perspective* OR opinion* OR view*), 2069 hits, 69 could not be retrieved, 2000 imported in EPPI
Search date: 5.11.2012					
137	Agricola	http://agricola.nal.usda.gov/booleancube/booleancube_search_cit.html	("protected area"OR"nature reserve"OR park OR monument OR "wilderness area"OR"world heritage site"OR sanctuary OR refuge OR "biosphere reserve"OR"protected landscape"OR"management area"OR"sacred forest"OR"sacred grove")AND(governance OR self-governance OR institution OR rule OR norm OR polity OR policy OR "paper park"OR participation OR conflict OR exclusion OR access)AND forest, - doesn't yield results, adapt	("protected area" OR"nature reserve"OR park OR monument OR "wilderness area"OR"world heritage site"OR sanctuary OR refuge OR "biosphere reserve"OR"protected landscape"OR"management area"OR"sacred forest"OR"sacred grove")AND(governance) AND forest, 5 hits. 1 relevant	(governance OR institution OR rule OR norm OR polity OR policy OR "paper park"OR trust OR conflict OR exclusion OR access OR "elite capture")AND forest AND("protected area"OR"nature reserve"OR park OR monument OR "wilderness area"OR"world heritage site"OR sanctuary OR refuge OR "biosphere reserve"OR"protected landscape"OR"management area"OR"sacred forest"OR"sacred grove"), 136 hits (all downloaded)
0	Science Index	http://scienceindex.com	None relevant		

372	CAB abstracts	http://www.cabdirect.org	(("governance" OR "self-governance" OR "institution*" OR "rule*" OR "norm*" OR "polit*" OR "polic*" OR "paper park*" OR "participat*" OR "accountab*" OR "legitima*" OR "compliance" OR "enforcement*" OR "coercion*" OR "trust*" OR "conflict*" OR "exclusion*" OR "access" OR "local elite*" OR "elite capture") AND ("protected area*" OR "nature reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" OR "sanctuar*" OR "refug*" OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND forest* AND ("conserv*" OR "deforest*" OR "degrad*" OR "biodiversity" OR desert* OR "threaten" OR "leakage*" OR "spillover*" OR "spill-over*" OR "reforest*" OR "afforest*" OR "re-growth" OR "regrowth" OR "forest clearance" OR "land use change" OR "land cover change" OR "loss*" OR "attitude*" OR "behavi*" OR "perception*" OR "belief*" OR "perspective*" OR "opinion*" OR "view*")) AND la:(En OR English), 372 hits, all uploaded to EPPI		
Search date: 6.11.2012					
17	Public Library of Science (PLOS)	http://www.plosone.org/search/advancedSearch	(("governance" OR "self-governance" OR "institution*" OR "rule*" OR "norm*" OR "polit*" OR "polic*" OR "paper park*" OR "participat*" OR "accountab*" OR "legitima*" OR "compliance" OR "enforcement*" OR "coercion*" OR "trust*" OR "conflict*" OR "exclusion*" OR "access" OR "local elite*" OR "elite capture") AND ("protected area*" OR "nature reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" OR "sanctuar*" OR "refug*" OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND forest* AND ("conserv*" OR "deforest*" OR "degrad*" OR "biodiversity" OR desert* OR "threaten" OR "leakage*" OR "spillover*" OR "spill-over*" OR "reforest*" OR "afforest*" OR "re-growth" OR "regrowth" OR "forest clearance" OR "land use change" OR "land cover change" OR "loss*" OR "attitude*" OR "behavi*" OR "perception*" OR "belief*" OR "perspective*" OR "opinion*" OR "view*"), 2130 hits, 17 downloaded		
37	Directory of Open Access Journals (DOAJ)	http://www.doaj.org/doaj?func=home&uiLanguage=en	All Fields=park AND <i>All Fields=governance</i> , 24 hits, 6 downloaded	All Fields=protected area AND All Fields=governance, 13 hits, 2 downloaded	All Fields=protected area AND All Fields=people, 47 hits, 13 relevant
5	ECONpapers Research papers on economic	http://econpapers.repec.org	protected area governance, 27 hits, 3 relevant	park people biodiversity forest, 4 hits. 2 relevant	

	s				
Search date: 7.11.2012					
0	COPAC	http://copac.ac.uk/	KEYWORDS: biodiversity park governance protected area conservation people, 25 hits, 0 relevant		
9	Social Science research Network- SSRN	http://papers.ssrn.com/sol3/DisplayAbstractSearch.cfm	Protected area biodiversity conservation, 13 hits, 0 relevant	community biodiversity conservation, 23 hits, 5 relevant	governance biodiversity conservation, 10 hits, 3 relevant; Search 4: governance protected area, 18 hits, 1 relevant
<u>0</u>	ECONOLIT		<u>NO access</u>		
Search date: 9.11.2012					
10	International Development Research Center (IDRC) digital library	http://idl-bnc.idrc.ca/dspace/advanced-search	((("protected area"OR "nature reserve"OR park OR monument OR "wilderness area"OR "world heritage site"OR sanctuary OR refuge OR "biosphere reserve"OR "protected landscape"OR "management area"OR "sacred forest"OR "sacred grove")AND(governance OR self-governance OR institution OR rule	("governance" OR "self-governance" OR "institution*" OR "rule*" OR "norm*" OR "polit*" OR "polic*" OR "paper park*" OR "participat*" OR "accountab*" OR "legitima*" OR "compliance" OR "enforcement*" OR "coercion*" OR "trust*" OR "conflict*" OR "exclusion*" OR "access" OR "local elite*" OR "elite capture")	governance and ("protected area"OR "nature reserve"OR park OR monument OR "wilderness area"OR "world heritage site"OR sanctuary OR refuge OR "biosphere reserve"OR "protected landscape"OR "management area"OR "sacred forest"OR "sacred grove"), 4155 hits, 0 relevant

			OR norm OR polity OR policy OR "paper park"OR participation OR conflict OR exclusion OR access)AND forest)), 2618 hits, first 100 only checked, 10 imported	AND ("protected area*" OR "nature reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" OR "sanctuar*" OR "refug*" OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND forest* AND ("conserv*" OR "deforest*" OR "degrad*" OR "biodiversity" OR desert* OR "threaten" OR "leakage*" OR "spillover*" OR "spill-over*" OR "reforest*" OR "afforest*" OR "re-growth" OR "regrowth" OR "forest clearance" OR "land use change" OR "land cover change" OR "loss*" OR "attitude*" OR "behavi*" OR "perception*" OR "belief*" OR "perspective*" OR "opinion*" OR "view*"), 3295, 0 relevant	
Search date: 16.11.2012					
13	Index to Theses Online	http://www.theses.com/	("protected area~" OR "nature reserve~" OR park~ OR monument~ OR "wilderness area~" OR "world heritage site~" OR sanctuar* OR refug* OR "biosphere reserve~" OR "protected landscape" OR "management area~" OR "sacred forest~" OR "sacred grove~") AND forest~ AND (governance OR institution OR norm OR policy OR polity), 32 hits, 13 relevant		

50	PROQUEST Theses	http://www.proquest.com/products-services/pqdt.html	("protected area*" OR "nature reserve*" OR park* OR monument* OR "wilderness area*" OR "world heritage site*" OR sanctuar* OR refug* OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND forest* AND (governance OR institution OR norm OR policy OR polity), 220 (approximate count without duplicates), 50 relevant
Search date: 19.11.2012			
118	PROQUEST Journals	http://www.proquest.com/products-services/pq_ed_journals.html	same keywords ("protected area*" OR "nature reserve*" OR park* OR monument* OR "wilderness area*" OR "world heritage site*" OR sanctuar* OR refug* OR "biosphere reserve*" OR "protected landscape" OR "management area*" OR "sacred forest*" OR "sacred grove*") AND forest* AND (governance OR institution OR norm OR policy OR polity)), (5012) Approximate result count without duplicates, 118 checked (10%) according to relevance, 118 relevant
Search date: 15.10.2012			
23	Ostrom Workshop in Political Theory and Policy Analysis	http://dlc.dlib.indiana.edu/dlc/advanced-search , http://www.indiana.edu/~workshop/publications/index.php	"(((protected area) OR (nature reserve) OR park OR monument OR (wilderness area) OR (world heritage site) or sanctuary or refuge or (biosphere reserve) or (protected landscape) or (management area) or (sacred forest) or (sacred grove)) AND (forest) AND ((attitude OR behavior OR perception OR belief OR perspective OR opinion) or (conservation or deforestation or degradation or biodiversity or desertification or threaten or leakage or spillover or spill-over or reforestation or afforestation or re-growth or regrowth Or (forest clearance) or (land use change) or (land cover change) or loss)))", 4226 hits, FIRST 200, items sorted by relevance; 23 relevant

ANNEX 3: SEARCH THROUGH SPECIALIST WEBSITES

Relevant titles	Organisation name	URL	Date of search	Notes	Search 1	Search 2	Search 3	Search 4
0	Online Knowledge Base: Natural Resources Governance around the World	http://www.agter.org/	07-10-12		None relevant - summaries of existing texts			
4	CGIAR Systemwide Program on Collective Action and Property Rights	http://www.capri.cgiar.org/	22-10-12	on gender and community, social capital, some of them in Spanish	"protected area" in advanced research under field "any word", 161 hits, 3 relevant	Forest reserve in title (the other management categories were without hits), 1 hit, 1 paper	"conserv*" or "deforest*" or "degrad*" or "biodiversity" or desert* or "threaten" or "leakage*" or ("spillover*" or "spill-over*") or "reforest*" or "afforest*" or ("re-growth" or "regrowth") Or "forest clearance" or "land use change" or "land cover change" or "loss*" /doesn't search	na
0	CATIE	http://www.catie.ac.cr/Magazin_ENG.asp?CodIdioma=ENG	22-10-12		None relevant - no info on PAs			
0	The Community-Based Natural Resource	http://www.cbnrm.net/	22-10-12		None relevant - CBNRM main topic..compilation of papers..			

	Management Network							
0	CGIAR-a global agricultural research partnership	http://www.cgiar.org/	22-10-12	agriculture research, food security, progress reports etc	Protected areas, 14 hits, 0 relevant	Governance, 14 hits, 0 relevant	na	na
24	CIFOR_Center for international forestry research	http://www.cifor.org/	22-10-12	also include publ. in sci journals	protected area under advanced search abstract and title; Online library, search listed as @most relevant@ Search results for keyword "and protected area", language " English", more than 290 hits, 18 relevant	Search results for keyword "and "protected area*" and governance and forest*", language " English" search listed as @most relevant@, more than 290, 0 relevant/non-duplicate	language " English", 'most relevant', "protected area*" OR "nature reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "management area*" or "sacred forest*" or "sacred grove*", more than 290, 6 relevant	na
	Forest, Trees and People Program	http://www.cof.orst.edu/org/istf/ftpp.htm	22-10-12	<p>composed of several central websites< Africa (anglophone): http://www.ftpp.or.ke/ - DOESNT WORK</p> <p>Africa (Francophone): (Not available)</p> <p>South Asia: http://www-trees.slu.se/nepal/watchindex.htm -DOESNT WORK</p> <p>Asia-South Pacific: http://www.recoftc.org – WORKs, see below</p> <p>Europe: http://www-trees.slu.se - DOESNT WORK</p> <p>Latin America:http://www.cnr.org.pe/fao/index.htm - DOESNT WORK</p>				

				North America & Caribbean: http://www.cof.orst.edu/org/istf redirects to http://www.istf-bethesda.org/index-english.html Sweden FFTP: http://www-trees.slu.se/ -DOESNT WORK FTPP at FAO-UN: http://www.fao.org/forestry/FON/FONP/cfu/cfu-e.stm WORKS, see below				
0	RECOFTC -the center for people and forests	http://www.recoftc.org	22-10-12	Publications by Topic - Community Forestry- none relevant, Climate Change- none relevant, Forest Conflict -policy briefs only., Livelihoods -benefits sharing – none relevant, Rights- none relevant, Governance - bulletins, p. Briefs, Benefits- none relevant, FPIC in REDD+- nothing relevant				
0	INTERNATIONAL SOCIETY OF TROPICAL FORESTERS	http://www.istf-bethesda.org/index-english.html	22-10-12	no publications section (last updated 2010)				
	FAO Forestry	http://www.fao.org/forestry/FON/FONP/cfu/cfu-e.stm	22-10-12	Redirected : document repository http://www.fao.org/documents/en/search/init (see below)				
0	FAO document repository	http://www.fao.org/documents/en/search/init	22-10-12	na	("protected area*" or "park*") and governance - in free text, 15337: with refinement: forestry management and conservation -100 hits; Sustainable natural resources management 53 hits, 0 relevant	protected area*" OR "nature reserve*" OR park* OR "monument*" OR "wilderness area*" OR "world heritage site*" or "sanctuar*" or "refug*" or "biosphere reserve*" or "protected landscape" or "management area*" or "sacred	na	na

						forest*" or "sacred grove*", 16123 with refinement:for estry management and conservation - 100 hits; Sustainable natural resources management 53 hits, 0 relevant		
0	Community forestry international	http://www.communityforestryinternational.org/ http://www.communityforestryinternational.org/publications/research_reports/index.html	22-10-12	Research reports – none relevant, on community forestry. Working papers: only 3 available, none relevant Articles: none relevant				
0	Conservation International	Error! Hyperlink reference not valid.	22-10-12	Searched in all publications, 79 hits, none relevant				
0	Cooperation Commons: Interdisciplinary study of cooperation and collective action.	http://www.cooperationcommons.com/	22-10-12	Research summaries only, overall irrelevant				
0	Cultural survival	http://www.culturalsurvival.org/current-projects/universal-periodic-review	22-10-12	none relevant, not focus on PAs				

1	Canadian Forest Service Publications	http://cfs.nrcan.gc.ca/publications	22-10-12	na	(protected&area)&governance; 14 hits, 1 relevant	(protected & area) (nature & reserve) (park), 2 hits, 0 relevant	park and governance and forest, 14 hits, 0 relevant	na
0	The Eldis Communities (a free on-line interactive space)	http://community.eldis.org/	22-10-12	None relevant, networking scientific site with blogs				
3	ConserveOnline (online library, created and maintained by The Nature Conservancy)	http://conserveonline.org/ , http://conserveonline.org/search?site=library&q=protected+areas&image.x=2&image.y=6;	24-10-12	na	park+governance+forest, 127 hits, 1 relevant	protected+area+governance, 261 hits, 1 relevant	protected+area+governance+forest, 163 hits, 1 relevant	na
0	CSID	http://csid.asu.edu/soecolib	24-10-12	link broken, page not found..it is website of school of human evolution and social change				
0	USAID - DEVELOPMENT EXPERIENCE CLEARINGHOUSE database	http://dec.usaid.gov/index.cfm , https://dec.usaid.gov/dec/content/AdvancedSearch.aspx?ctID=ODVhZjk4NWQtM2YyMi00YjRmLTkxNjktZTcxMjM2NDBmY2Uy	24-10-12	na	((protected area*) OR (nature reserve*) OR park* OR monument* OR (wilderness area*) OR (world heritage site*) or sanctuar* or refug* or (biosphere reserve*) or (protected landscape) or (management area*) or (sacred forest*) or (sacred grove*)) and governance and forest, 23 hits, 0 relevant	((protected area*) OR (nature reserve*) OR park* OR monument* OR (wilderness area*) OR (world heritage site*) or sanctuar* or refug* or (biosphere reserve*) or (protected landscape) or (management area*) or	na	na

						(sacred forest*) or (sacred grove*)) and governance and forest and institutions, 23 hits, 0 relevant		
0	UK Department of international development	http://www.dfid.gov.uk	24-10-12	topics hunger, wellbeing	protected area governance forest, no results	protected area forest, no results	parks governance forest, no results	na
11	Environmental change institute OXFORD	http://www.eci.ox.ac.uk/publications/index.php	24-10-12	na	conservation, parks, protected areas, 8 relevant,	protected+area+governance, 142 hits, 3 relevant	na	na
23	Eldis	http://www.eldis.org/	24-10-12		'protected area', 162 hits, 6 relevant	'protected area governance', 29 hits, 6 relevant	park governance, 15 hits, 11 relevant	
0	European Tropical Forest Research Network (ETFRN)	http://www.etfrn.org	24-10-12		protected area, 135 hits, 0 relevant			
0	FAO catalogue online	http://www.fao.org/ , http://www4.fao.org/fao/bib/	24-10-12		protected;area;institution;conservation, no hits	park governance effectiveness, 3 hits, 0 relevant		
0	First Peoples Worldwide	http://www.firstpeoples.org/	24-10-12	No publication section				
0	forest trends	http://www.forest-trends.org/publications.php	25-10-2012	Pre-selected keywords	Biodiversity, 34 hits, 0 relevant	Communities, 41 hits, 0 relevant	Deforestation, 10 hits, 0 relevant,	protected areas, 3 hits, 0 relevant;

									governance: 42, 0 relevant - all on forestry; forest conservation 10, 0 relevant
0	Forests Protection Portal	http://forests.org/	25-10-2012	No publication section					
1	International Fund for Agricultural Development (IFAD) - UN Agency	http://www.ifad.org/	25-10-2012		park+governance, about 199 results, 0 relevant	protected+area+governance, about 292 hits, 1 relevant	protected+area+governance+forest, 516 hits, 0 relevant		
8	International Institute for Environment and Development	http://www.iied.org	25-10-2012	Returns results In different languages	Biodiversity and conservation, 315 hits, 3 relevant	Participation, 9191 hits, 2 relevant	natural resource management, 690 hits, 3 relevant		
0	Institute on Governance	http://iog.ca/	25-10-2012	No (relevant) publications					
14	IUCN - World Commission on Protected Areas	http://www.iucn.org/about/union/commissions/wcpa/ , http://data.iucn.org/dbtw-wpd/commande/search.html	29-10-2012		((protected area*) / (nature reserve*) / park* / monument* / (wilderness area*) / (world heritage site*) / sanctuar* / refug* / (biosphere reserve*) / (protected landscape*) / ((management area*) & forest*) / (sacred grove*) & (forest*) & ((attitude* / behavi* / perception*	((protected area*) / (nature reserve*) / park* / monument* / (wilderness area*) / (world heritage site*) / sanctuar* / refug* / (biosphere reserve*) /	(governance / self-governance / institution* / rule* / norm* / polit* / polic* / (paper park*) / participat* / accountab* / legitima* / compliance / enforcement* / coercion* / trust* / conflict* / exclusion* / access / (local elite*) /	("NGO*" / non\$governmental & organization / private nature reserve* / privat* / governme* / communit	

					/ belie* / perspective* / opinion*) / (conservation / deforestation / degradation / biodiversity / desertification / threaten / leakage / spillover / spill-over / reforestation / afforest / re-growth / regrowth / (forest clearance) / (land use change) / (land cover change) / loss))), 97 hits, 8 relevant	(protected landscape*) / ((management area*) & forest*) / (sacred grove*)) & forest* & (governance / self- governance / institution* / rule* / norm* / polit* / polic* / (paper park*) / participat* / accountab* / legitima* / compliance / enforcement* / coercion* / trust* / conflict* / exclusion* / access / (local elite*) / elite capture), 45 hits, 2 relevant	elite capture) & forest* & conservation, 159, 5 relevant	y conserved area* / indigenou s / comanag * / co- manag* / collaborat ive / decentrali * / devolut* / joint managem ent / delegat* authorit* / integrated conservat ion developm ent / "ICDP*" / governan ce / self- governan ce / institution * / rule* / norm* / polit* / polic* / paper
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								park* / participat * / accountab * / legitima* / complian ce / enforcem ent* / coercion* / trust* / conflict* / exclusion * / access / local & elite* / elite capture) & (protected area* / nature reserve* / park* / monumen t* / wildernes s area* / world heritage site* / sanctuar* / refug* /
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								biosphere reserve* /protected landscape / managem ent area* / sacred forest* / sacred grove*) & forest* & (attitude* / behavi* / perceptio n* / belief* / perspecti ve* / opinion* / view* / co nserv* / deforest* / degrad* / biodiversi ty / desert* / threaten / leakage* / spillover* / spill-
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								over* / reforest* / afforest* / re- growth / regrowth / forest clearance / land use change / land cover change / loss*), no results
0	IUFRO - The global network for forest science cooperation	http://www.iufro.org/publications/ , http://www.iufro.org/publications/online-library/	29-10- 2012	Broken link				
0	Worlds Environmental Library	http://www.nzdl.org/fast-cgi-bin/library?a=p&p=about&c=envl	29-10- 2012		protected area park reserve forest conservation biodiversity governance, 50 hits, 0 relevant	forest protected area nature reserve park monument wilderness area world heritage site sanctuary refugey biosphere reserve sacred grove sacred forest protected	na	na

						landscape, 0 hits		
6	World Wildlife Fund	http://wwf.panda.org , http://wwf.panda.org/about_our_earth/all_publications/?uSearchTerm=governance&uMonth=0&uYear=0	30 and 3.10, 1-11-2012		Governance, 70 hits, 3 relevant,	park people, 3330 hits checked first 100, 3 relevant	park reserve governance, 180 hits, 0 relevant	na
11	Poverty and Conservation	http://povertyandconservation.info/en/bibliographies	30 and 3.10, 1-11-2012		Governance, 45 hits, 11 relevant	na	na	na
0	Protected areas and governance groupsite	http://protectedareasandgovernance.groupsites.com	30 and 3.10, 1-11-2012	blog-like site, networking function, links out to conserve online (already searched)				
0	Rainforest Portal	http://www.rainforestportal.org/	30 and 3.10, 1-11-2012	Link to library doesnt work, seems irrelevant				
0	Oxford Centre for Tropical Forests	http://www.tropicalforests.ox.ac.uk	30 and 3.10, 1-11-2012	not relevant (but, links to other relevant sites)				
0	United Nations	http://www.un.org/en/	30 and 3.10, 1-11-2012		'("protected area" OR "nature reserve" OR park OR monument OR "wilderness area " OR "world heritage site " OR sanctuary OR refuge OR "biosphere reserve" OR "protected landscape" OR "management area" OR "sacred forest" OR "sacred grove") AND governance, about 1320 sort but relevant, 0 relevant in	governance forest protected+area OR nature+reserve OR park OR monument OR wilderness+area OR world+heritage+site OR sanctuary OR refuge OR biosphere+reserve OR	(governance or self-governance or institution or rule or norm or polity or policy OR "paper park" OR participation OR accountability OR legitimacy OR compliance OR enforcement OR coercion OR trust OR conflict OR exclusion OR access OR "local elite" OR "elite	

					the first 100	protected+landscape OR management+area OR sacred+grove OR sacred+forest, 81 hits, 0 relevant	capture") AND ("protected area" OR "nature reserve" OR park OR monument OR "wilderness area" OR "world heritage site" OR sanctuary OR "refuge" OR "biosphere reserve" OR "protected landscape" OR "management area" OR "sacred forest" OR "sacred grove") AND Forest, 20 hits, 0 relevant	
0	UNDP	http://www.undp.org/ ,	30 and 3.10, 1-11-2012		("protected area" OR "nature reserve" OR park OR monument OR "wilderness area " OR "world heritage site " OR sanctuary OR refuge OR "biosphere reserve" OR "protected landscape" OR "management area" OR "sacred forest" OR "sacred grove") AND governance	"protected area" OR "nature reserve" OR park OR monument OR "wilderness area" OR "world heritage site " OR sanctuary OR refuge OR		

					AND forest, about 883 hits, 0 relevant among the first 100	“biosphere reserve” OR “protected landscape” OR “management area” OR “sacred forest” OR “sacred grove”, about 7350 hits, 0 relevant among the first 100		
0	UNDP_GEF	http://web.undp.org/gef/gef_library.shtml	30 and 3.10, 1-11-2012	SAME SEARCH AS UNDP (GOOGLE SEARCH OF THE WESITE)				
0	GEF Small Grants Programme	http://sgp.undp.org/		If there are publications available on this website, they are policy briefs	protected area governance conservation biodiversity, 15 hits, 0 relevant	governance conservation biodiversity park people, 0 hits		
4	UNEP-WCMC World Conservation Monitoring Centre	http://www.unep-wcmc.org/	30 and 3.10, 1-11-2012		protected area governance (filtered for types of publications - reports, journal papers), 14 hits, 1 relevant	conservation biodiversity governance, 18 hits, 1 relevant	protected area, 88 hits, 2 relevant	
2	United Nations Environmental Programme - UNEP	http://www.unep.org , http://ekh.unep.org/ , http://ekh.unep.org/?q=trip_search/advanced	30 and 3.10, 1-11-2012		protected area governance, 1 relevant	protected area, 44 hits, 1 relevant	Conservation, 159 hits, 0 relevant	
6	Wildlife conservation Society - WCS	http://www.wcs.org	30 and 3.10, 1-11-2012		Governance, 16 hits, 3 relevant	Park, 140 hits, 1 relevant	Conflict, 14 hits, 2 relevant	

1	World Bank	http://web.worldbank.org , http://documents.worldbank.org/curated/en/docad/vancesearch	30 and 3.10, 1-11-2012		(protected area* OR nature reserve* OR park* OR monument* OR wilderness area* OR world heritage site* or sanctuar* or refug* or biosphere reserve* or protected landscape OR management area* or sacred forest* or sacred grove*) AND forest AND (governance or management or institution or policy or conflict or participation or accountability or legitimacy), 124895 hits for english. 19126 for environment, too many hits, mostly reports and guidelines	(protected area* OR nature reserve* OR park* OR monument* OR wilderness area* OR world heritage site* or sanctuar* or refug* or biosphere reserve* or protected landscape OR management area* or sacred forest* or sacred grove*) AND forest AND governance, 21308 (in english, after 1.1. 1992, type: publications/journal paper); 1 relevant in first 50		
0	Nature Conservation Research Centre	http://www.ncrc-ghana.org/	30 and 3.10, 1-11-2012	No relevant results				

ANNEX 4: BIBLIOGRAPHIC SEARCH

Relevant Review	Previously screened relevant title (not included)	Title extracted	Include at abstract	Include at full-text	Full-text not obtained
1. Porter-Bolland L, et al. 2011 Community managed forests and forest protected areas: An assessment of their conservation effectiveness across the tropics. <i>Forest Ecol. Manage.</i> doi:10.1016/j.foreco.2011.05.034	17	17	13	1	1
2. HIRSCHNITZ-GARBERS, M and STOLL-KLEEMANN, S 2011 Opportunities and barriers in the implementation of protected area management: a qualitative meta-analysis of case studies from European protected areas. <i>The Geographical Journal</i> 177: 321–334	5	15	6	1	1
3. West P, Igoe J, Brockington D 2006 Parks and Peoples: The Social Impact of Protected Areas. <i>Annual Review of Anthropology</i> 35: 251-277. DOI:10.1146/annurev.anthro.35.081705.123308	8	25	17	0	8
4. Naughton-Treves L, Buck M and K Brandon 2005 "The Role of Protected Areas in Conserving Biodiversity and Sustaining Local Livelihoods" <i>Annual Review of Environment and Resources.</i> 30:219-252.	12	10	7	0	2
5. Coad L, Campbell A, Miles L, Humphries K 2008 The Costs and Benefits of Protected Areas for Local Livelihoods: a review of the current literature. Working Paper. UNEP World Conservation Monitoring Centre, Cambridge, U.K.	7	25	10	2	0
6. Nagendra H 2008 Do parks work? Impact of protected areas on land cover clearing.. <i>Ambio</i> 37(5): 330-7.	18	15	8	0	1
7. Joppa, L and Pfaff, A 2010 Reassessing the forest impacts of protection: the challenge of nonrandom location and a corrective method. <i>Ann N Y Acad Sci.</i> ;1185:135-49. doi: 10.1111/j.1749-6632.2009.05162.x.	28	16	10	0	4

8. Pagdee, A., Kim, Y.-S., Daugherty, P.J., 2006. What makes community forest management successful: a meta study from community forests throughout the world. <i>Society and Natural Resources</i> 19, 33–52.	0	0	0	0	0
9. Shahabuddin, G., Roa, M., 2010. Do community-conserved areas effectively conserve biological diversity? Global insights and the Indian context. <i>Biological Conservation</i> 143, 2926–2936.	13	24	12	0	3
10. Holmes G 2007 Protection, Politics and Protest: Understanding Resistance to Conservation. <i>Conservation and society</i> 5: 184-201 http://conservationandsociety.org/article.asp?issn=0972-4923;year=2007;volume=5;issue=2;spage=184;epage=201;aualast=Holmes	3	16	8	0	7
TOTAL	111	163	91	4	27

Extracted titles	Include at abstract	Include at full-text	Full-text not obtained
Source: Porter Bolland et al			
Brower, L.P., Castilleja, G., Peralta, A., Lopez-Garcia, J., Bojorquez-Tapia, L., Diaz, S., Melgarejo, D., Missrie, M., 2002. Quantitative changes in forest quality in a principal overwintering area of the monarch butterfly in Mexico, 1971–1999. <i>Conservation Biology</i> 16, 346–359.	1		
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E. Berglund), pp. 33-49. Berghahn, Oxford.			
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ANNEX 5: SEARCH THROUGH WEB SEARCH ENGINE

This search was done via googleScholar using 4 different search strings

	String description	Date of Search	Location of the reference	No. of hits	Number of downloaded titles	Duplicates identified by Mendeley	Duplicates identified by EPI reviewer	Total for title screening
String 1	governance+protected+area+forest	18.3.2015	Google Library	7380 0	first 159	0	49	110
String 2	allintext:(“community conserved area” OR indigenous OR (“comanagement” OR “co-management”) OR collaborative OR decentralisation OR devolution OR institution OR rule OR norm) AND forest AND (protected area OR park OR reserve) AND effectiveness	19.3.2015	Exported directly to Mendeley	9330 0	first 160	1	54	105
String 3	allintext:forest AND (protected area OR park OR reserve) AND (attitude OR behaviour OR conservation OR compliance OR enforcement OR coercion OR trust OR conflict OR exclusion OR access)	19.3.2015	Exported directly to Mendeley	7630 00	first 160	37	26	97
String 4	allintext:forest AND (protected area OR park OR reserve) AND (conservation OR deforestation OR degradation OR biodiversity OR desertification OR threaten OR leakage OR spillover OR spill-over OR reforestation OR afforestation OR regrowth)	19.3.2015	Exported directly to Mendeley	4330 00	first 160	129	10	21
Summary						167	139	333

ANNEX 6: LIST OF UNOBTAINABLE STUDIES

SRC. = source from where an article was obtained from and it is coded as follows: 1st search via 15 publication databases (=1), update search on WOK (=2), bibliography (=3), googlescholar (=4), grey literature (=5). More explanations on different sources and searches can be find in the main text

Total=145: No institutional subscription/Not able to track it online=125, Not in English=20

S R C	No.	Full reference	Reason
1	1	ALBRECHT L (1992) THE IMPORTANCE OF NATURAL FOREST RESERVES FOR SPECIES PROTECTION ON WOODLANDS. <i>FORSTWISSENSCHAFTLICHES CENTRALBLATT</i> . 111(4):	No institutional subscription/Not able to track it online
1	2	Animon M M; (2008) Management of protected areas in the tropics: an exploratory and socio-economic analysis of ecotourism based strategies in Periyar Tiger Reserve, India. : Bangor.	No institutional subscription/Not able to track it online
1	3	Barton Alan William; (2002) Regulatory Authority and Participatory Protected Areas Management at Cerro Azul-Meambar National Park, Honduras.	No institutional subscription/Not able to track it online
1	4	BROWER B (1991) CRISIS AND CONSERVATION IN SAGARMATHA-NATIONAL-PARK, NEPAL. <i>SOCIETY & NATURAL RESOURCES</i> . 4(2): .	No institutional subscription/Not able to track it online
1	5	Clark C (2000) Land tenure delegitimation and social mobility in tropical Peten, Guatemala. <i>HUMAN ORGANIZATION</i> . 59(4):	No institutional subscription/Not able to track it online
1	6	Fatima Sultana (2009) Human impacts on the biodiversity of the Darrah Wildlife Sanctuary in Rajasthan.. <i>International Journal of Climate Change: Impacts and Responses</i> . 1(3): 1-14.	No institutional subscription/Not able to track it online
1	7	Gaveau D L. A; (2008) Evaluating the effectiveness of protected areas in reducing tropical deforestation in Sumatra.. : Kent.	No institutional subscription/Not able to track it online
1	8	Ghimire K B; (1992) Parks and people: livelihood issues in national parks management in Thailand and Madagascar. Discussion Paper - United Nations Research Institute for Social Development. 29:	No institutional subscription/Not able to track it online
1	9	Gooch P (1999) A community management plan: the Van Gujjars and the Rajaji National Park.. In: . Richmond: Curzon Press Ltd, pages 79-112.	No institutional subscription/Not able to track it online
1	10	Gupta H K; (1999) A study of factors influencing participation in joint forest management in the Northwest Himalayas, India. : Aberdeen.	No institutional subscription/Not able to track it online
1	11	Hao Y, Wang J, Jiang H (2009) The dynamics of land cover	No institutional

		change pattern and landscape fragmentation in Jiuzhaigou Nature Reserve, China. Proceedings of SPIE - The International Society for Optical Engineering. .	subscription/Not able to track it online
1	12	Holden T (2004) Current arrangements for the control of deforestation and the conservation of terrestrial biological diversity in Thailand. Asia Pacific Journal of Environmental Law. 8(1-2): 69-102.	No institutional subscription/Not able to track it online
1	13	Hovardas TasosBE Grossberg, SP; (2009) FOREST MANAGEMENT WITHIN PROTECTED AREAS: THE SOCIAL PRODUCTION OF NATURE IN THE DADIA FOREST RESERVE, GREECE. FOREST MANAGEMENT. : .	No institutional subscription/Not able to track it online
1	14	Musavi A, Khan J A; Kumar S, Khan A, Malik P K; Kushwaha S P.S; Khati D S; Sarin G D; (2006) A study of Tiger human conflict in buffer zone of the Corbett Tiger Reserve: Protected area-people relationship. International Journal of Ecology and Environmental Sciences. 32(3): 241-257.	No institutional subscription/Not able to track it online
1	15	Loesch M A; (1978) The attitudes of residents in selected Minnesota communities toward Voyageurs National Park.. Dissertation Abstracts International, A. 39(2): p.1103.	No institutional subscription/Not able to track it online
1	16	MacKinnon KathyBE Bermingham, Eldredge; Dick Christopher W; Moritz Craig (2005) Parks, people and policies: conflicting agendas for forests in southeast Asia.. Tropical rainforests: past, present, and future..	No institutional subscription/Not able to track it online
1	17	Malugu Isaac O. E; (2007) Resource-use conflicts and management challenges for Pugu and Kazimzumbwi forest reserves in kisarawe and Ilala districts, Tanzania. DISCOVERY AND INNOVATION. 19:	No institutional subscription/Not able to track it online
1	18	Manakadan Ranjit Swaminathan, S. Daniel, J. C. Desai, Ajay A; (2009) HUMAN-ELEPHANT CONFLICT IN A COLONISED SITE OF DISPERSED ELEPHANTS: KOUNDINYA WILDLIFE SANCTUARY (ANDHRA PRADESH, INDIA). Journal of the Bombay Natural History Society. 106(3):	No institutional subscription/Not able to track it online
1	19	Martinez R, Espejel I (1999) Conservation and Management of Ecosystems within and without Protected Natural Areas in Baja California, Mexico. Environments. 27(3): x4-43.	No institutional subscription/Not able to track it online
1	20	Martinez R Espejel, RBE Nelson, JG; Day JC, Sportza L (2003) Conservation and management of ecosystems within and without protected natural areas, Baja California, Mexico. PROTECTED AREAS AND THE REGIONAL PLANNING IMPERATIVE IN NORTH AMERICASE PARKS AND HERITAGE SERIES. 7	No institutional subscription/Not able to track it online
1	21	McCabe J Terrence; (2003) Disequilibrium Ecosystems and Livelihood Diversification among the Maasai of Northern Tanzania: Implications for Conservation Policy in Eastern Africa. Nomadic Peoples. 7(1): 74-91	No institutional subscription/Not able to track it online
1	22	Mehta J (1996) Park-people interface in Parsa Wildlife Reserve, Nepal.. TRI News. 15(1): 11-12.	No institutional subscription/Not able to track it online
1	23	Mukamuri B B; Manjengwa J M; Anstey S (2009) Beyond	No institutional

		Proprietorship Murphree's Laws on Community-Based Natural Resource Management in Southern Africa. Harare: Weaver Press & IDRC, Ottawa, ON, CA.	subscription/Not able to track it online
1	24	Olthof I, Pouliot D (2005) Evaluation of a signature extension approach for monitoring ecological integrity in and around protected areas: A case study for Prince Albert National Park. Proceedings of the 26th Canadian Symposium on Remote Sensing, .	No institutional subscription/Not able to track it online
1	25	Pan H, Le T C; Luo C L; Tan F L; Chen G R; Fang B Z; Xie S Z; (2006) Investigation of dependence degree of adjacent communities' economy on resources of the Zhangjiangkou Mangrove Forestry National Nature Reserve. Wetland Science. 4(4): 274-279.	No institutional subscription/Not able to track it online
1	26	Peckett Marilyn K; (1998) Narrowing the Road: Co-Management with Anishnabe at the Riding Mountain National Park (Winnipeg, Manitoba). Crossing Boundaries, the Seventh Biennial Conference of the International Association for the Study of Common Property, Vancouver, British Columbia, Canada.	No institutional subscription/Not able to track it online
1	27	Powell G V. N; Palminteri S, Carlson B, Boza M A; (2002) Successes and failings of the Monteverde Reserve Complex and Costa Rica's system of national protected areas.. In: . Washington: Island Press, pages 156-171.	No institutional subscription/Not able to track it online
1	28	Rueda Ximena (2007) Landscapes in transition: Forest-cover change, conservation, and structural adjustment in the southern Yucatan. : .	No institutional subscription/Not able to track it online
1	29	Sharma Diwakar Gavali, Deepa; (2006) Protected areas in Gujarat: Prospects and perspectives. Indian Forester. 132(10):	No institutional subscription/Not able to track it online
1	30	Simsik MJGP SAF; (1997) The forest conservation approaches of an integrated conservation and development project: The case of the Andohahela ICDP, Fort Dauphin, Madagascar. MEETING IN THE MIDDLE, PROCEEDINGS.	No institutional subscription/Not able to track it online
1	31	Singh Neera Mendiratta; (2010) Environmental subjectivity, democratic assertions and reimagination of forest governance in Orissa, India. : .	No institutional subscription/Not able to track it online
1	32	Srivastava Aseem (1997) People's participation. A vital component in management of Gir Protected Area. Indian Forester. 123(6):	No institutional subscription/Not able to track it online
1	33	Srivastava Sanjay (2006) Dependence of local people and issues in conserving local resources: Case of Dalma Wildlife Sanctuary, Jharkhand. Indian Forester. 132(1): .	No institutional subscription/Not able to track it online
1	34	Stahl Johannes Sikor, Thomas Dorondel, Stefan; (2009) The institutionalisation of property rights in Albanian and Romanian biodiversity conservation. International Journal of Agricultural Resources Governance and Ecology. 8(1):	No institutional subscription/Not able to track it online
1	35	Stern Marc Jonathan; (2006) Understanding local reactions to national parks: The nature and consequences of local interpretations of park policies, management, and outreach (North Carolina, Tennessee, United States Virgin Islands, Ecuador).	No institutional subscription/Not able to track it online
1	36	Tacconi L (2000) Biodiversity and ecological economics.	No institutional

		Participation, values and resource management.. London: Earthscan Publications Ltd.	subscription/Not able to track it online
1	37	Tamrakar A, Sharma B K; (2002) Conservation and development of local forest resources and wildlife through community forestry: a case study from Baghmara community forest, Chitwan.. Banko Janakari. 12(1): 49-53.	No institutional subscription/Not able to track it online
1	38	Tiwari B K. Tynsong, H. Lynser, M. B; (2010) FOREST MANAGEMENT PRACTICES OF THE TRIBAL PEOPLE OF MEGHALAYA, NORTH-EAST INDIA. <i>JOURNAL OF TROPICAL FOREST SCIENCE</i> . 22(3):	No institutional subscription/Not able to track it online
1	39	Toillier Aurelie, Lardon Sylvie, Herve Dominique (2009) An environmental governance support tool: community-based forest management contracts (Madagascar). <i>International Journal of Sustainable Development</i> . 11(2-3-4): 187-205	No institutional subscription/Not able to track it online
1	40	Trusty Teresa (2010) The Politics of Representing Nature, Culture, and Conservation in Northwestern Bolivia.	No institutional subscription/Not able to track it online
1	41	Tshiguvho Thidinalei (2008) Sacred traditions and biodiversity conservation in the forest montane region of Venda, South Africa.	No institutional subscription/Not able to track it online
1	42	Usongo L Nkanje, BT; (2004) Participatory approaches towards forest conservation: The case of Lobeke National Park, South east Cameroon. <i>INTERNATIONAL JOURNAL OF SUSTAINABLE DEVELOPMENT AND WORLD ECOLOGY</i> . 11(2): .	No institutional subscription/Not able to track it online
1	43	Zanotti Laura C; (2008) Re-envisioning indigenous territoriality: Nature, place and space in the Kayapo Reserve. :	No institutional subscription/Not able to track it online
1	44	Zou Lue-liu Dao Zhi-ling Long Chun-lin; (2009) Study on community forest resource management of the Zhuang nationality in Southeast Yunnan of China. <i>Journal of Plant Resources and Environment</i> . 18(1):	No institutional subscription/Not able to track it online
1	45	Bakarr MohamedBA Robles Gil, Patricio Mittermeier, Russell A. K; (2005) West Africa's upper Guinea forest region: transboundary conservation in a conflict zone.. <i>Transboundary conservation: a new vision for protected areas</i> . [Cemex Books on Nature.].. :	No institutional subscription/Not able to track it online
1	46	BROTHERTON I (1983) DETERMINANTS OF LANDSCAPE CHANGE - THE CASE OF AFFORESTATION IN THE NATIONAL-PARKS OF ENGLAND AND WALES. <i>LANDSCAPE PLANNING</i> . 9(3-4): .	No institutional subscription/Not able to track it online
1	47	BROTHERTON I HETHERINGTON, M; (1989) CONSERVATION AS A RESTRAINT ON AFFORESTATION IN PRESSURED AND PROTECTED AREAS OF UPLAND BRITAIN. <i>BIOLOGICAL CONSERVATION</i> . 48(2): .	No institutional subscription/Not able to track it online
1	48	Cawley R M; Freemuth J (1993) Tree farms, mother earth, and other dilemmas: the politics of ecosystem management in Greater Yellowstone. <i>Society & natural resources</i> .. 6(1): 41-53.	No institutional subscription/Not able to track it online
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1	51	Denisiuk Z Stoyko, S; (1993) International Polish-Slovak-Ukrainian biosphere reserve "Eastern Carpathians". Ukrayins'kyi Botanichnyi Zhurnal. 50(3): .	No institutional subscription/Not able to track it online
1	52	Singh V K; (1998) Designed domains: a legal analysis of issues related to the proposed Rajaji National Park, India. Conflict and collaboration : eighth Workshop on Community Management of Forest Lands /. : 96-115.	No institutional subscription/Not able to track it online
1	53	EMANUELSSON U (1991) MAKING CHANGES FOR PRESERVATION. LARSSON, E. (ED.). NATURSKYDDSFÖRENINGENS ARSBOK, ARGANG 82. FORÄNDERLIG NATUR; (NATURE PROTECTION SOCIETY YEARBOOK, VOL. 82. EVER-CHANGING NATURE). 143P. NATURSKYDDSFÖRENINGEN: STOCKHOLM, SWEDEN. ILLUSTRATIONS. MAPSSE Naturskyddsforeningens Arsbok. : .	No institutional subscription/Not able to track it online
1	54	Flint Carmel Pugh, Dailan Beaver, DanielBE Lunney, Daniel; (2004) The good, the bad and the ugly: science, process and politics in forestry reform and the implications for conservation of forest fauna in north-east New South Wales.. Conservation of Australia's forest fauna. Second edition.. : .	No institutional subscription/Not able to track it online
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1	56	Hashimoto Zentaro (1997) An institutional evaluation study on prefectural natural parks in Japan.. Bulletin of the Tokyo University Forests. 98: .	No institutional subscription/Not able to track it online
1	57	Hemam Natar S. Reddy, B. Mohan Leonetti, Donna L. BE Bhasin; Bhasin Veena (2000) Maintenance of village forest reserves: A dying traditional-conservation practice among the tribals of Manipur, NE India.. Man-environment relationshipSE Human Ecology Special Issue. : .	No institutional subscription/Not able to track it online
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1	59	Lopez Pizarro, E BA des Clers; B (1986) Cano Negro National Wildlife Refuge. A case of multiple use and rural development based on wildlife and other natural resources.. Wildlife management in Neotropical moist forest. Conservation status of the jaguar (Panthera onca). Manaus, State of Amazonas (Brazil) April 4-5, 1986.. : .	No institutional subscription/Not able to track it online
1	60	Muhonen T (1997) From Karelianism to national park - 100 years of tourism and nature conservation at Koli.. (14): 249-256.	No institutional subscription/Not able to track it online

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1	63	REDFORD K H; (1989) MONTE PASCOAL BRAZIL INDIGENOUS RIGHTS AND CONSERVATION IN CONFLICT. Oryx. 23(1): .	No institutional subscription/Not able to track it online
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1	70	Warren C R; (1999) National parks: The best way forward for Scotland?. Scottish Forestry. 53(2): .	No institutional subscription/Not able to track it online
1	71	Roth H H; (1984) We all want the trees: Resource conflict in the Tai National Park, Ivory Coast. National parks, conservation, and development : the role of protected areas in sustaining society : proceedings of the World Congress on National Parks, Bali, Indonesia, 11-22 Oct 1982 / ed. J.A. McNeely and K.R. Miller.. : 127-129.	No institutional subscription/Not able to track it online
1	72	Xu Yangqian Lu, Baiwei Li, Hongtao; (1992) Establishment	No institutional

		of forest and fauna nature reserve in Guangdong and their trend of development. <i>Forest Research</i> . 5(4): .	subscription/Not able to track it online
1	73	ZUBE EH (1986) LOCAL AND EXTRA-LOCAL PERCEPTIONS OF NATIONAL-PARKS AND PROTECTED AREAS. <i>LANDSCAPE AND URBAN PLANNING</i> . 13(1): .	No institutional subscription/Not able to track it online
1	74	Cheng S, Zhang J, Xu F (2010) Factors influencing local residents' attitude towards nature conservation in natural tourism destination: A comparative study on China's Jiuzhaigou National park and UK's new Forest National Park. <i>Shengtai Xuebao/ Acta Ecologica Sinica</i> . 30(23): 6487-6494.	Not in English
1	75	Cohenca Daniel (2007) Annual evolution of deforestation in the Tapajos National Forest: 1997-2005. <i>NATUREZA & CONSERVACAO</i> . 5(1):	Not in English
1	76	Doumenge Charles Yuste, Juan-Enrique Garcia Gartlan, Steve Lang; (2001) [Forest biodiversity conservation in Atlantic regions of central Africa: Is the protected area system efficient?] <i>FT Conservation de la biodiversite forestiere en Afrique centrale Atlantique: Le reseau d'aires protegees est-il adequat? Bois et Forets des Tropiques</i> . (268):	Not in English
1	77	Dünckmann F, Wehrhahn R (1998) Nature conservation in Brazil's coastal rain forests. Concepts and conflicts. <i>Naturschutz im Brasilianischen küstenregenwald. Konzepte und konflikte</i> . 50(5): 299-305.	Not in English
1	78	Durand Leticia (2010) TO THINK POSITIVE IS NOT ENOUGH. ATTITUDES CONCERNING CONSERVATION IN THE SIERRA DE HUAUTLA BIOSPHERE RESERVE, MEXICO. <i>INTERCIENCIA</i> . 36(6)	Not in English
1	79	Fialová J, Vyskot I, Schneider J (2009) The evaluation of nature conservation and forest functions interests on the example of the Český les protected landscape area. <i>Hodnocení zájmů ochrany přírody a funkcí lesů na příkladu chráněné krajinné oblasti český les</i> . 57(1): 35-40.	Not in English
1	80	Kufner Maura B. Claver, Silvia; (2002) Nacunan biosphere reserve and sustainable development in the Monte Desert, Argentina <i>FT La reserva de biosfera de Nacunan y el desarrollo sustentable en el Desierto del Monte, Argentina. Gestion Ambiental</i> . (8): .	Not in English
1	81	Li Zuo-Zhou Huang Hong-Wen Tang Deng-Kui Wang Li-Jun Pu (2006) Situation and strategy of biodiversity conservation in the Houhe National Nature Reserve, Hubei province, China II. Situation, threaten and strategy of biodiversity conservation. <i>Wuhan Zhiwuxue Yanjiu</i> . 24(3):	Not in English
1	82	Liu Jing Miao Hong Ouyang Zhi-yun Li Xiao-guang; (2008A) Typical patterns on the relationships between protected areas and local communities. <i>Shengtaixue Zazhi</i> . 27(9): .	Not in English
1	83	Liu Jing Miao, Hong Ouyang, Zhiyun Xu, Weihua Zheng (2008B) Analyzing the effectiveness of community management in Chinese nature reserves. <i>Shengwu Duoyangxing</i> . 16(4):	Not in English
1	84	Liu J, Miao H, Zheng H, Ouyang Z Y; Wang X K; Li X G; Jiang B (2009) Discussion about the relationship pattern	Not in English

		between Wolong Nature Reserve and local community. Shengtai Xuebao/ Acta Ecologica Sinica. 29(1): 259-271.	
1	85	Mori Akira S; (2009) Forest management for conserving biodiversity: matrix management in Swedish forests.. Hozen Seitai gaku Kenkyu. 14(2): .	Not in English
1	86	Nucci J C; Fávero O A; (2003) Sustainable development and conservation of the nature in protected areas: The case of Ipanema National Forest (Iperó/SP). Desenvolvimento sustentável e conservação da natureza em unidades de conservação: o caso da Floresta Nacional de Ipanema (Iperó/SP). 7(7): 63-77.	Not in English
1	87	Ribeiro Maria Beatriz N. Verissimo, Adalberto; (2007) Patterns and causes of deforestation in protected areas of Rondonia-Brazil. NATUREZA & CONSERVACAO. 5(1): .	Not in English
1	88	Roldan Mateo Carminati, Alejandra Biganzoli, Fernando Parue; (2010) Are private refuges effective for conserving ecosystem properties? FT Las reservas privadas son efectivas para conservar las propiedades de los ecosistemas?. Ecologia Austral. 20(2):	Not in English
1	89	Schiavetti A, Magro T C; Santos M S; (2012) Implementation of Protected Areas for central Corridor of Atlantic forest in Bahia: Challenges and limits. Implementação das unidades de conservação do Corredor Central da mata Atlântica no estado da Bahia: Desafios E Limites. 36(4): 611-623.	Not in English
1	90	Tejeda-Cruz C (2009) Biodiversity conservation and local communities: Conflicts in protected natural areas in the Lacandona Forest, Chiapas, Mexico. Conservación de la biodiversidad y comunidades locales: conflictos en áreas naturales protegidas de la selva lacandona, Chiapas, México. 34(68): 57-88.	Not in English
1	91	Wu Wei-ming Ge Da-bing; (2008) Threat and Protection for the Biodiversity Conservation about Shunhuangshan Mountain National Forest Park. Hunan Shifan Daxue Ziran Kexue Xuebao. 31(3): .	Not in English
2	92	Santamarina Campos, Beatriz , Bodi Ramiro, Julio (2013) RURAL PLACES VERSUS NATURALIZED SPACES. THE LOGIC OF KNOWLEDGE AND ACKNOWLEDGMENT IN THE PROTECTED HERITAGE AREAS. Aibr-Revista De Antropologia Iberoamericana. 8: 112-138.	Not in English
2	93	Adekunle Victor Ajibola; Nair Narayanan K; Srivastava Awadhesh K; Singh N K; (2014) Volume yield, tree species diversity and carbon hoard in protected areas of two developing countries. Forest Science and Technology. 10: 89-103.	No institutional subscription/Not able to track it online
2	94	Cao Huiming, Tang Mingfang, Deng Hongbing, Dong Rencai (2014) Analysis of management effectiveness of natural reserves in Yunnan Province, China. International Journal of Sustainable Development and World Ecology. 21: 77-84.	No institutional subscription/Not able to track it online
2	95	Casanova Catarina, Sousa Claudia, Costa Susana (2014) Are Primates and the Forest Forever? Perceptions of Non-Human Primates at Cantanhez Forest National Park, Guinea-Bissau. Folia Primatologica. 85: 49-50.	No institutional subscription/Not able to track it online

2	96	Chowdhury Mohammad Shaheed Hossain; Koike Masao, Rana Parvez, Muhammed Nur (2013) Community development through collaborative management of protected areas: evidence from Bangladesh with a case of Rema-Kalenga Wildlife Sanctuary. <i>International Journal of Sustainable Development and World Ecology</i> . 20: 63-74.	No institutional subscription/Not able to track it online
2	97	Chowdhury Mohammad Shaheed Hossain; (2014) A Review Discussion on the State of Collaborative Protected Area Management Around the World and Comparison with That of Bangladesh. In: Chowdhury M S. H; Forest Conservation in Protected Areas of Bangladesh: Policy and Community Development Perspectives. . , pages 201-230.	No institutional subscription/Not able to track it online
2	98	Chowdhury Mohammad Shaheed Hossain; Izumiyama Shigeyuki, Koike Masao (2014) Assessment of the Community Participation in and Attitudes Towards Co-management Programs in Rema-Kalenga Wildlife Sanctuary. In: Chowdhury M S. H; Forest Conservation in Protected Areas of Bangladesh: Policy and Community Development Perspectives. . , pages 143-169.	No institutional subscription/Not able to track it online
2	99	Chowdhury Mohammad Shaheed Hossain; Koike Masao, Izumiyama Shigeyuki (2014) Forest Conservation in Protected Areas of Bangladesh Policy and Community Development Perspectives Introduction. In: Chowdhury M S. H; Forest Conservation in Protected Areas of Bangladesh: Policy and Community Development Perspectives. . , pages 1-21.	No institutional subscription/Not able to track it online
2	100	Chowdhury Mohammad Shaheed Hossain; Koike Masao, Izumiyama Shigeyuki (2014) Impact of Co-management on Rural Development: Evidence from Community Survey in and Around Rema-Kalenga Wildlife Sanctuary. In: Chowdhury M S. H; Forest Conservation in Protected Areas of Bangladesh: Policy and Community Development Perspectives. . , pages 111-141.	No institutional subscription/Not able to track it online
2	101	Dressler Wolfram (2014) Green governmentality and swidden decline on Palawan Island. <i>Transactions of the Institute of British Geographers</i> . 39: 250-264.	No institutional subscription/Not able to track it online
2	102	Elgert Laureen (2014) Governing portable conservation and development landscapes: reconsidering evidence in the context of the Mbaracayu Biosphere Reserve. <i>Evidence & Policy</i> . 10: 205-222.	No institutional subscription/Not able to track it online
2	103	Gargano D, Mingozi A, Massolo A, Rinaldo S, Bernardo L (2012) Patterns of vegetation cover/dynamics in a protected Mediterranean mountain area: Influence of the ecological context and protection policy. <i>Plant Biosystems</i> . 146: 9-18.	No institutional subscription/Not able to track it online
2	104	Juneja Shelja K; Sobti Nupur (2013) Restoring Ecosystems through Sacred Groves Strengthened by Inclusive Government and Community Approaches. <i>Annals of Biology (Hissar)</i> . 29: 439-442.	No institutional subscription/Not able to track it online
2	105	Mai Daria, Wetzel Fabienne, Lanwehr Ralf (2013) POWER TO THE PEOPLE!? THE ROLE OF PROCEDURAL FAIRNESS WITHING DECISION PROCESSES OF COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT IN NAMIBIA. . .	No institutional subscription/Not able to track it online

2	106	Mukul S A; Herbohn J, Rashid A Z. M. M; Uddin M B; (2014) Comparing the effectiveness of forest law enforcement and economic incentives to prevent illegal logging in Bangladesh. <i>International Forestry Review</i> . 16: 363-375.	No institutional subscription/Not able to track it online
2	107	Nielsen Martin Reinhardt; Meilby Henrik (2013) Determinants of compliance with hunting regulations under Joint Forest Management in Tanzania. <i>South African Journal of Wildlife Research</i> . 43: 120-137.	No institutional subscription/Not able to track it online
2	108	Rashid A Z. M. Manzoor; Khan Niaz Ahmed; (2014) Role of Co-management Organizations in Protected Area Governance: Some Observations from the Chunati Wildlife Sanctuary. In: Chowdhury M S. H; <i>Forest Conservation in Protected Areas of Bangladesh: Policy and Community Development Perspectives</i> . . , pages 181-200.	No institutional subscription/Not able to track it online
2	109	Reisland Melissa A; Lambert Joanna E; (2013) Shared space in a sacred forest: Habitat use by humans and Javan gibbons (<i>Hylobates moloch</i>). <i>American Journal of Physical Anthropology</i> . 150: 231-232.	No institutional subscription/Not able to track it online
2	110	van Lavieren , Els (2013) The Endangered Barbary Macaque (<i>Macaca sylvanus</i>): Conservation Efforts, Struggles and Success Stories in Morocco. <i>Folia Primatologica</i> . 84: 337-337.	No institutional subscription/Not able to track it online
4	111	Colfer CJP (2010) <i>The Complex Forest: " Communities, Uncertainty, and Adaptive Collaborative Management"</i> . . .	No institutional subscription/Not able to track it online
4	112	Jaireth H, Smyth D (2003) <i>Innovative governance: indigenous peoples, local communities, and protected areas</i>	No institutional subscription/Not able to track it online
4	113	Kramer R, Schaik C, Johnson J (1997) <i>Last stand: protected areas and the defense of tropical biodiversity</i>	No institutional subscription/Not able to track it online
4	114	Nelson F (2012) <i>Community rights, conservation and contested land: The politics of natural resource governance in Africa</i>	No institutional subscription/Not able to track it online
4	115	Oates JF (1999) <i>Myth and reality in the rain forest: How conservation strategies are failing in West Africa</i>	No institutional subscription/Not able to track it online
4	116	Ojha HR, Timsina NP, Kumar C (2008) <i>Communities, forests and governance: Policy and institutional innovations from Nepal</i>	No institutional subscription/Not able to track it online
4	117	Primack RB, Bray D, Galletti HA, Ponciano I (2013) <i>Timber, Tourists, and Temples: Conservation And Development In The Maya Forest Of Belize Guatemala And Mexico</i>	No institutional subscription/Not able to track it online
3	118	Nelson, A., Chomitz, K.M., 2009. Do protected areas reduce deforestation? A global assessment with implications for REDD. In: <i>Dialogue on Forests, Governance and Climate Change</i> . IEG, Washington, DC .	No institutional subscription/Not able to track it online
3	119	Brockington D 2002 <i>Fortress conservation: the preservation of the Mkomazi Game Reserve, Tanzania</i> James Currey, Oxford	No institutional subscription/Not able to track it online
3	120	Albers HJ, Grinspoon E. 1997. A comparison of the enforcement of access restrictions between Xishuangbanna Nature Reserve (China) and Khao Yai National Park	No institutional subscription/Not able to track it online

		(Thailand). <i>Environ. Conserv.</i> 24:351–62	
3	121	Alexander SE. 2000. Resident attitudes towards conservation and black howler monkeys in Belize: the Community Baboon Sanctuary. <i>Environ. Conserv.</i> 27(4):341–50	No institutional subscription/Not able to track it online
3	122	Baviskar A. 2003. States, communities and conservation: the practice of ecodevelopment in the Great Himalayan National Park. In <i>Battles Over Nature: Science and the Politics of Conservation</i> , ed. V Saberwal, M Rangarajan, pp. 256–83. Delhi: Permanent Black	No institutional subscription/Not able to track it online
3	123	Ganguly V. 2004. <i>Conservation, Displacement and Deprivation: Maldhari of Gir Forest of Gujarat</i> . New Delhi: Indian Soc. Inst.	No institutional subscription/Not able to track it online
3	124	Igoe J. 2004. <i>Conservation and Globalisation: A Study of National Parks and Indigenous Communities from East Africa to South Dakota</i> . Belmont, CA:Wadsworth/Thomson Learning	No institutional subscription/Not able to track it online
3	125	Nyhus P. 1999. <i>Elephants, tigers and transmigrants: conflict and conservation at Way Kambas National Park, Sumatra, Indonesia</i> . PhD thesis. Univ. Wisc., Madison	No institutional subscription/Not able to track it online
3	126	Paudel NS. 2005. <i>Conservation and livelihoods: an exploration of the local responses to conservation interventions in Royal Chitwan National Park in Nepal</i> . PhD thesis. Univ. Reading, United Kingdom	No institutional subscription/Not able to track it online
3	127	Shyamsundar P, Kramer R. 1997. Biodiversity conservation— at what cost? A study of households in the vicinity of Madagascar’s Mantadia National Park. <i>Ambio</i> 26(3):180–84	No institutional subscription/Not able to track it online
3	128	McShane T, Wells M. 2004. <i>Getting Biodiversity Projects to Work: Towards More Effective Conservation and Development</i> . New York City: Columbia Univ. Press	No institutional subscription/Not able to track it online
3	129	Oates J. 1999. <i>Myth and Reality in the Rain Forest: How Conservation Strategies Are Failing in West Africa</i> . Berkeley: Univ. Calif. Press	No institutional subscription/Not able to track it online
3	130	Brandon, K., Redford, K.H. and Sanderson, S.E. 1998. <i>Parks in Peril: People, Politics, and Protected Areas</i> . The Nature Conservancy and Island, Washington DC, 540 pp.	No institutional subscription/Not able to track it online
3	131	Joppa, L. & A. Pfaff. 2009. <i>Global Park Impacts: How Much Deforestation Has Protection Avoided?</i> Duke University Nicholas School of the Environment Working Paper.	No institutional subscription/Not able to track it online
3	132	Zepeda, Y. et al . 2009. <i>Evaluating the Impacts of Mexican Protected Areas on Deforestation from 1993–2000</i> . Resources for the Future Working Paper.	No institutional subscription/Not able to track it online
3	133	Delgado, C. et al. 2008. <i>Will Nearby Protected Areas Constrain Road Impacts On Deforestation?</i> Presentation at the NASA LBA conference ‘Amazon In Perspective’, Manaus.	No institutional subscription/Not able to track it online
3	134	Pfaff, A. 2009. <i>Evaluating deforestation impacts of protected areas</i> . Presented at Connecting Amazon Protected Areas and Indigenous Lands to REDD Frameworks, Stanford, CA.	No institutional subscription/Not able to track it online
3	135	Garcia, C.A., Pascal, J.P., 2005. Sacred forests of Kodagu: ecological value and social role. In: Cederlof, G., Sivaramakrishnan, K. (Eds.), <i>Ecological Nationalisms: Nature, Livelihoods and Identities in South Asia</i> . University of Washington Press, Seattle, pp. 199–232.	No institutional subscription/Not able to track it online
3	136	Johari, R., 2007. <i>Of paper tigers and invisible people: the</i>	No institutional

		cultural politics of nature in Sariska. In: Shahabuddin, G., Rangarajan, M. (Eds.), Making Conservation Work: Securing Biodiversity in this New Century. Permanent Black, Delhi, India, pp. 48–80.	subscription/Not able to track it online
3	137	Poffenberger, M., McGean, B., Khare, A., 1996. Communities sustaining India's forests in the twenty-first century. In: Poffenberger, M., McGean, B. (Eds.), Voices, Forest Choices, Joint Forest Management in India. Oxford University Press, Delhi, pp. 17–55.	No institutional subscription/Not able to track it online
3	138	Deb Roy, S. and P. Jackson. 1993. Mayhem in Manas: The threats to India's wildlife reserves. In Indigenous Peoples and Protected Areas (ed. E. Kemf), pp. 156-161. Earthscan, London.	No institutional subscription/Not able to track it online
3	139	Grove, R.H. 1990. Colonial conservation, ecological hegemony and popular resistance: Towards a global synthesis. In Imperialism and the Natural World (ed. J.M. MacKenzie), pp. 15-50. Manchester University Press, Manchester.	No institutional subscription/Not able to track it online
3	140	Haenn, N. 2005. Fields of Power, Forests of Discontent: Culture, Conservation and the State in Mexico. University of Arizona Press, Tucson.	No institutional subscription/Not able to track it online
3	141	Jacoby, K. 2001. Crimes Against Nature: Squatters, Poachers, Thieves and the Hidden History of American Conservation. University of California Press, London.	No institutional subscription/Not able to track it online
3	142	Norgrove, L. 2002. Parking Resistance and Resisting the Park: The Theory and Practice of National Park Management. Ph.D thesis. Manchester: Institute for Development Policy and Management, University of Manchester. UK.	No institutional subscription/Not able to track it online
3	143	Nygren, A. 2003. Conflicts Over Wilderness Protection and Local Livelihoods in Rio San Juan, Nicaragua. In Ethnographies of Conservation: Environmentalism and the Distribution of Privilege (eds. D. Anderson and E. Berglund), pp. 33-49. Berghahn, Oxford.	No institutional subscription/Not able to track it online
3	144	Sullivan, S. 2003. Dissent or Libel in Resistance to a Conservancy in North-West Namibia. In Ethnographies of Conservation: Environmentalism and the Distribution of Privilege (eds. D. Anderson and E. Berglund), pp. 69-86. Bergahn, Oxford.	No institutional subscription/Not able to track it online
5	145	IUCN (2006) Gobernanza de las Áreas Protegidas en los Andes Tropicales. Memorias del Taller Regional, 11 y 12 de mayo de 2006. UICN. Quito, Ecuador. : . file:///Users/biljanamacura/Dropbox/MapReview all files/Grey Literature/24.10 Conserve online_Mendeley/IUCN 2006.pdf	Not in English

ANNEX 7: LIST OF EXCLUDED STUDIES WITH REASONS FOR EXCLUSION

A brief clarification of "rejection" codes

Total rejected	CODE	Example or further explanation
111	No relevant intervention	E.g. focus on ecotourism, (agro)forestry or war/armed conflict in PAs, empowerment or describes conflict during establishment of PA
144	No appropriate or relevant comparator	Comparator non-existent or inappropriate
175	No relevant outcomes	Study outcomes cannot be classified as attitudes, behaviour, ecological or spill-over effects
241	No sufficient information on governance	Information provided is not sufficient for the governance comparison of any conclusion regarding governance role in effectiveness
30	Not forest protected area	The study setting is located in a PA, but not in the forest ecosystem
21	Country-level/policy analysis	Not focusing on local level governance
95	Comment paper or relevant review	Includes: non-primary research papers, methodological, comment or theoretical papers, essays, brief discussions, editorials
817	TOTAL	

SRC. = source from where an article was obtained from and it is coded as follows: 1st search via 15 publication databases (=1), update search on WOK (=2), bibliography (=3), googlescholar (=4), grey literature (=5). More explanations on different sources and searches can be found in the main text.

S R C.	No	Full reference	Reason for rejection
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1	2	Amoah M, Wiafe E D; (2012) Livelihoods of fringe communities and the impacts on the management of conservation area: The case of Kakum National Park in Ghana. International Forestry Review. 14(2): 131-144.	No appropriate or relevant comparator
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5	813	Kretser Heidi E; Curtis Paul D; Knuth Barbara A; (2009) Landscape, Social, and Spatial Influences on Perceptions of Human-Black Bear Interactions in the Adirondack Park, NY. Human Dimensions of Wildlife. 14(6): 393-406.	No relevant intervention
5	814	Lastarria-Cornhiel S, Barahona Z, Orti L (2008) Promoting transformations by linking nature, wealth and power. Case study: The Women of Isoso: Livelihoods, Governance and Natural Resources in the Gran Chaco, Bolivia. WCS TRANSLINK Program, USAID. : . file:///Users/biljanamacura/Dropbox/MapReview all files/Grey Literature/30.10 WCS_MED/Lastarria-Cornhiel USAID file_20110518_073910_CaseStudy_WomenOfIsoso-Bolivia_VDhH.pdf	No relevant intervention
5	815	Nampindo Simon, Plumptre Andrew (2005) A SOCIO-ECONOMIC ASSESSMENT OF COMMUNITY LIVELIHOODS IN AREAS ADJACENT TO CORRIDORS LINKING QUEEN ELIZABETH NATIONAL PARK TO other protected areas in western Uganda. WCS. : . file:///Users/biljanamacura/Dropbox/MapReview all files/Grey Literature/30.10 WCS_MED/NAMPINDO file_20120127_172931_Conserving+corridors+around+QENP_rUI.pdf	No relevant intervention
5	816	Redford KH, Grippo Catherine (2008) PROTECTED AREAS, GOVERNANCE, and scale. Working Paper no 36. NY: WCS. : . file:///Users/biljanamacura/Dropbox/MapReview all files/Grey Literature/30.10 WCS_MED/REDFORD file_20120123_015951_WCSwp36-- PAs,+governance,+and+scale_TMVwp.pdf	No relevant outcomes

3	817	Bossart, J.L., Opuni-Frimpong, E., Kuudaar, S., Nkrumah, E., 2006. Richness, abundance, and complementarity of fruit-feeding butterfly species in relict sacred forests and forest reserves of Ghana. <i>Biodiversity and Conservation</i> 15, 333–359.	No appropriate or relevant comparator
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ANNEX 8: CODING TOOL WITH CODE DEFINITIONS AND RATIONALE FOR CODING, INCLUDING CRITICAL APPRAISAL CODES, SCORING SYSTEM AND ABBREVIATIONS USED IN THE MAP

Code Name and categories	Definitions	Rationale for the coding
Article ID	Unique ID of the publication	Identification and tracing the evidence
Study ID	Unique ID of the study	Identification and tracing the evidence
Linked study	Article ID of a publication from a same study, 0 if no link	Identification and tracing the evidence
Background publication (yes=1, the main source of information/additional publication that fully fits the inclusion criteria=0)	Publication provides only a background information to the study, but is not by itself includable as a separate study	Identify the main study
Source: 1st search (=1), update search on WOK (=2), bibliography (=3)	Publication search source.	Identification and tracing the evidence
Publ. year	Year when the publication was published	Basic bibliographic characteristics
Full reference	Complete reference	Basic bibliographic characteristics
Short reference	First Author and publication year	Basic bibliographic characteristics
Abstract	If any, copied from the publication	Gives fast and brief study overview
Author's keywords	Keywords stated by the author	Facilitates database browsing
Publication: peer reviewed/published (=1); grey lit. (=2)	Publication is peer-reviewed and published or otherwise?	Classification of evidence type
Publication Type: Journal article (=1); Book chapter (in an edited book) (=2); Book (=3); Thesis or dissertation (=4) Technical report (=5) Conference paper (=6) Other (=7) Cannot tell (=99)		Classification of evidence type

Authorship: academic authors (1), NGO (2), park authority (3), government department (4), other (describe), affiliation unclear (99)		A potential for bias in reporting/conflict of interests
General methodology: Qualitative (=1); Quantitative (=2); Mixed (=3)	1= qualitative data collection and analysis of un-structured or informal interviews, focus groups, participant observation, etc; 2=quantitative data collection and analysis of semi-or structured, interviews, various types of social and ecological surveys, satellite data analysis, etc; 3=the mixed qualitative and quantitative methods	Classification of evidence type
Observational study (=1), Experimental study=0		Classification of evidence type
PA Name	Name(s) of protected area(s) studied	Categorisation of studies by geographical location
IUCN Category (NR=not reported, NA=not applicable)	Reported in the publication or if missing, obtained from the protectedplanet.net, NR= not reported neither in the protected planet nor in the publication. If multiple PAs, use abbreviations of PA names to indicate specific IUCN category	Level of strictness and resource access
Research location: Region	Region of the study location: East Asia, South-East Asia, South Asia, Latin America-central, Latin America-North, Latin America-South, Europe, Africa	Categorisation of studies by geographical location
Research location: Country 1	Country where the research is conducted	Categorisation of studies by geographical location
Research location: Country 2	Second research location	Categorisation of studies by geographical location
Research location: Country 3	Third research location	Categorisation of studies by geographical location
Aim of study (or alternatively research questions)	Copied from the publication	To assess if stated aims correspond to study results
Sample size	Number of PA(s) studied	Methodological details
Multi-site (1=yes)	Studied in more than one country	Methodological details

Broad Outcome: ecological (=1); attitudes (=2); behaviour(=3); spill-over (=4); none relevant (0)	Broad outcome category	Outcome categorisation
Detailed Outcome (NA-not applicable)	Details of the outcomes measured (with the units -e.g.: %)	Outcome detail description
No. of outcomes (NA-not applicable)	Sum of the total number of outcomes reported (1 to 4)	Outcome categorisation
Governance type (general, stated): State (=1), Private (=2), NGO (=3), Community (=4), Co-management (=5), Hybrid/other (describe)	Definitions in the protocol - Macura et al 2013	Intervention description
Comparator(s): Governance change over time in the same PA (=1); Governance compared to other governance regime in different PAs or to an other governance type within the same PA during same time period (=2), or in different forest governance regimes during same time period (3), Other (describe)		Comparator type
Study design: Case study (=1); Case series or Time series (=2); Cross-sectional study (=3); Controlled before-and-after study (=4); Controlled after-only study (=5); Sequential mixed method (=6); Concurrent mixed method design (=7), other (describe)	See the next table	Study quality appraisal -internal validity
Data Collection Tool: Structured survey (=1), Semi-structured survey (=2), Scales (=3), Interview (=4), Focus group (=5), Satellite/areal images (=6), Other (describe)		Methodological details
Local community location: core zone (=1), buffer zone (=2), transition zone(=3), outside PA(=4), inside PA (=5), other (describe); not specified (=99),		Potential reasons for heterogeneity and effect modifiers
Type of the study interviewees/actors: residents (=1), ex-residents (=2), tourists(=3), community leaders(=4), community representatives(=5), park authorities(=6), volunteers(=7), experts(=8), government staff(=9), NGO staff(=10), other(describe), not specified (=99), not applicable (NA)		Methodological details
Additional reported cause of changes (apart from	E.g.: agriculture expansion, population increase,	Potential reasons for

governance) in case of the land use change studies (describe), (NR=not reported, not relevant)	migration, change of the policies,	heterogeneity and effect modifiers
PA establishment year (NR=not reported)	Year when PA was established	Potential reasons for heterogeneity and effect modifiers - for assessing quality of baseline
Status year from protectedplanet.net (NA =not applicable)	From protectedplanet.net	Potential reasons for heterogeneity and effect modifiers - if information from the publication missing
Survey year (NR=not reported)	Year(s) when the research/survey was conducted; or years of analysed satellite images	Potential reasons for heterogeneity and effect modifiers - for assessing quality of baseline
PA size (in km sq., NR=not reported, NA=not applicable)	Size of studied protected areas	Potential reasons for heterogeneity and effect modifiers
Comparator appropriate for governance assessment? Comment (NA=not applicable)	Is comparator relevant for the stated aims and conclusions of the study? Other methodological details?	Study quality appraisal -internal validity
Level of methodological detail: Low=1; Medium=2; High =3;	1=no sufficient details on data collection and/or data analysis procedures, method selection not justified, 2= no important methodological details missing, selection of methods justified and fits the research question; 3=very detailed explanation of the data collection and analysis procedures, info on ethical approval included, study limitation, confounding and biases commented on	Study quality appraisal -internal validity
Measurements of ecological outcomes: subjective/perception based or self-reported (=0); objective (=1).	E.g.: changes in the forest cover assessed through analysis of satellite images versus perception of the changes in forest cover reported by the local people); doesn't apply (=NA)	Study quality appraisal -internal validity

Further comments		Reviewer additional notes and observations for study description
Link in protectedplanet.net		Link to additional information source

<p>Study designs definitions Adapted from: Harris et al. 2006 (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1380192/) and Langerich 2015 (https://onlinecourses.science.psu.edu/stat507/06/intro)</p>
Case study (=1): in-depth non-experimental qualitative study of a single location/protected area/local community within, usually studied over time in a real life context, using documents, interviews, observations. Frequently reports on unusual, extreme or rare cases
Case series or Time series (=2): quantitative non-experimental study in multiple time periods, outcomes measured during the intervention. Before-After (BA) design (=2A): If measurements done before and after intervention
Cross-sectional study (CI) (=3): quantitative non-experimental study conducted in one point of time (e.g. survey), provides a snapshot. Not clearly established if intervention preceded the measured outcomes. Has non-randomly selected control groups.
Controlled before-and-after study (BACI) (=4): quasi-experiment with controls, measure of outcomes before and after the intervention
Controlled after only study (=5): quasi-experiment with controls, measure of outcomes after the intervention ONLY
Sequential mixed method (=6): qual>quant OR quan>qual (CODES FOR EACH PART of the design to be added)
Concurrent mixed method design (=7): qual and quant at the same time (CODES FOR EACH PART of the design to be added)

Abbreviations used in map	
BR	Biosphere Reserve
WHS	World Heritage Site
PA	Protected Area
NOTE: other abbreviations visible in the database are abbreviated PA names	

ANNEX 9: SYSTEMATIC MAP DATABASE

Complete database (excel file format) is available from:

<https://www.dropbox.com/s/fj39870rizlid59/Additional%20file%209.xlsx?dl=0>

ANNEX 10: PROJECT INFORMATION SHEET



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INFORMATION SHEET FOR PARTICIPANTS - QUESTIONNAIRE

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Research Project Name: Testing the effectiveness of forest governance mechanisms in conservation policy and practices within protected area: The case of Central Indian Tiger Reserves.

We would like to invite you to take part in this postgraduate research project. Participation is entirely optional, and choosing NOT to take part will not disadvantage you in any way. Before you decide whether you want to take part however, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

1. What is the purpose of the study?

The aims of the research are 1) to analyse tiger conservation practices and policy, 2) compare and evaluate conservation performances of different Reserves in Central India, 3) to improve methodology for evaluation of conservation governance and 4) to design policy recommendations for effective Tiger Reserves.

2. Why have you been invited?

You have been invited to participate in this research as we think you might provide some key information for the understanding of the governance processes and quality, threats, problems and overall performance of this Reserve in regards to biodiversity conservation.

3. What will you have to do?

Participants who agree to take part will fill out the questionnaire. This will take approximately 30 minutes.

4. Anonymity and Confidentiality

Questionnaires will be anonymous and only aggregated data will be used and published. The names of respondents and their organisations will NOT be revealed in the final report. Data will be stored securely and handled according to Code for the Protection of Personal Data (Legislative Decree no. 196/2003, Republic of Italy). Only the researcher and principal supervisor will have access to these data.

4. Do you have to take part?

It is up to you to decide whether to take part or not. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. In addition to withdrawing yourself from the study, you may also withdraw any data/information you have provided, as long as you request its withdrawal before it is transcribed for use in the final report, by approximately January 2014.

5. Benefits

Unfortunately there is no payment for taking part in this research.

Researchers hope that the study outcomes will improve conservation practices and policies, while taking into account local population needs.

6. Feedback

All participants will be provided with a copy of the final report. If you have any questions or concerns, you can contact the researcher and supervisors at University of Padova (Italy) and Bangor University (United Kingdom) using the details below for further advice and information. Also, if you feel you have been harmed in any way as a result of taking part in this research, please contact the supervisor (NOT the researcher) directly.

Researcher: **Biljana Macura** (biljana.macura@studenti.unipd.it), PhD student

Principal Supervisor: dr. **Laura Secco** (laura.secco@unipd.it)

Department of Land, Environment, Agriculture and Forestry

University of Padova

Viale dell'Università 16, 35020 Agripolis - Legnaro (PD), Italy

Co-Supervisor: prof. **Andrew Pullin** (a.s.pullin@bangor.ac.uk)

Centre for Evidence-Based Conservation

School of the Environment, Natural Resources and Geography

Bangor University

Bangor, Gwynedd LL57 2UW, United Kingdom



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INFORMATION SHEET FOR PARTICIPANTS - INTERVIEWS

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Research Project Name: Testing the effectiveness of forest governance mechanisms in conservation policy and practices within protected area: The case of Central Indian Tiger Reserves.

We would like to invite you to take part in this postgraduate research project. Participation is entirely optional, and choosing NOT to take part will not disadvantage you in any way. Before you decide whether you want to take part however, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

1. What is the purpose of the study?

The aims of the research are 1) to analyse tiger conservation practices and policy, 2) compare and evaluate conservation performances of different Reserves in Central India, 3) to improve methodology for evaluation of conservation governance and 4) to design policy recommendations for effective Tiger Reserves.

2. Why have you been invited?

You have been invited to participate in this research as we think you might provide key information for the understanding of the tiger conservation in India, historical, legal, institutional or social context of it.

3. How will you be interviewed and what will happen to the information you provide?

Participants who agree to take part will be interviewed either in person or by Skype/telephone. Interviews are expected to last up to 1 hour. Interviews will be recorded, subject to your permission. These recordings of interviews will be deleted upon transcription. If you do not wish your interview to be recorded, your responses will be directly transcribed into text.

4. Anonymity and Confidentiality

The names of interviewees and their organisations will NOT be revealed in the final report. Participants will be identified by pseudonym. Lists of these pseudonyms and participant names/addresses will be stored securely and handled according to Code for the Protection of Personal Data (Legislative Decree no. 196/2003, Republic of Italy) during the processing and thereafter, these personal data will be destroyed. Only the researcher and principal supervisor will have access to these data.

4. Do you have to take part?

It is up to you to decide whether to take part or not. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. In addition to withdrawing yourself from the study, you may also withdraw any data/information you have provided, as long as you request its withdrawal before it is transcribed for use in the final report, by approximately January 2014.

5. Benefits

Unfortunately there is no payment for taking part in this research.

Researchers hope that the study outcomes will improve conservation practices and policies, while taking into account local population needs.

6. Feedback

All participants will be provided with a copy of the final report. If you have any questions or concerns, you can contact the researcher and supervisors at University of Padova (Italy) and Bangor University (United Kingdom) using the details below for further advice and information. Also, if you feel you have been harmed in any way as a result of taking part in this research, please contact the supervisor (NOT the researcher) directly.

Researcher: **Biljana Macura** (biljana.macura@studenti.unipd.it), PhD student

Principal Supervisor: dr. **Laura Secco** (laura.secco@unipd.it)

Department of Land, Environment, Agriculture and Forestry

University of Padova

Viale dell'Università 16, 35020 Agripolis - Legnaro (PD), Italy

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ANNEX 11: PARTICIPANT CONSENT FORM



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Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Research Project Name: Testing the effectiveness of forest governance mechanisms in conservation policy and practices within protected area: The case of Central Indian Tiger Reserves.

Participant Consent Form

Researcher's name Biljana Macura

The researcher named above has briefed me to my satisfaction on the research for which I have volunteered. I understand that I have the right to withdraw from the research at any point. I also understand that my rights to anonymity and confidentiality will be respected.

I agree to having the interview/discussion recorded. YES () NO ()

I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signature of participant

Date

This form will be produced in duplicate. One copy should be retained by the participant and the other by the researcher.

Bangor University's 'Code of Practice for the Assurance of Academic Quality and Standards of Research Programmes' (Code 03)
<https://www.bangor.ac.uk/ar/main/regulations/home.htm>

ANNEX 12: INTERVIEW GUIDE FOR FEDERAL AND NATIONAL ACTORS

- 1) History and changes in management practices within Central Indian Tiger Reserves (CITRs);
- 2) Current establishment, implementation and management process: main actors, strengths and weaknesses of the management authority;
- 3) Governance quality;
- 5) TRs funding and cost-effectiveness;
- 6) Main threats to tiger conservation and to CITRs;
- 7) Local people and tiger conservation in CITRs;
- 8) Perception of CITRs success;
- 9) Future of tiger and CITRs.

ANNEX 13: QUESTIONNAIRES FOR THE LOCAL COMMUNITY: ECO-DEVELOPMENT

BEFORE YOU START: PLEASE READ THE TEXT BELOW TO EVERY RESPONDENT

Questionnaire Code: _____ Check 1 ___ Check 2 ___ Entered ___

*My name is [full name of enumerator]. I am here on behalf of **Biljana Macura** who is collecting information for her studies. She is a PhD Student and researcher at University of Padova in Italy. Her research is about Tiger reserves governance and welfare of local communities.*

Participation in this research is entirely voluntary. If you choose to take part in the survey your name will not be recorded and your answers will not be shared under any circumstances with other villagers or the authorities. The findings of this research will appear in aggregated form only. This survey will take approximately 1 hour. You shall not directly benefit from this survey, but it is hoped that thanks to it, a better management of the reserve is achieved. Would you like to continue with the questions?

PLEASE FILL IN THE INFORMATION BELOW PRIOR TO THE INTERVIEW. DO NOT ASK.

Date / ___ / ___ / 14	Interview started at ___:___
Enumerator's Initials:	Unique respondent's ID _____
Village:	Panchayat
Hamlet:	
Distance of the household to the village center (approx.): _____ m _____ min	Distance of the household to the nearest forested area (approx.): _____ m _____ min
ED implemented in the village? YES NO	JFM implemented in the village? YES NO

PLEASE FILL IN THE INFORMATION BELOW PRIOR TO THE INTERVIEW. DO NOT ASK.

House Walls: 1 = Mud; (putai___w/o putai___) 2 = Burnt bricks (cement plaster__w/o plaster__);

3 = Other material (**describe**)_____

Roof: 1 = Thatch / grass/bamboo; 2 = Iron / metal/asbestos sheets;

3 = Tiles; 4 = Other material (**describe**)_____

Floor: 1 = Mud; 2 = Floor tiles; 3 = Cement; 4 = Other material (**describe**)_____

ASK FOLLOWING QUESTIONS:

1. What is your first name (or nickname)? **Surname is not needed!**_____

2. Gender **CIRCLE:** Male = 1, Female = 0

3. What is your age? _____ (**IF UNSURE, ADD 900 TO THE AGE. E.G. APPROX. 30 = 930**)

4. How long have you lived in this village? _____ Years

IF ALL HIS/HER LIFE, WRITE DOWN RESPONDENT AGE. IF IN MONTHS ADD "M" IN FRONT OF THE NUMBER - >> GO TO Q7 if person is not an immigrant

5. Where have you lived before? Indicate the Tehsil: _____

6. Why immigrated here? **CIRCLE:** 1 = marriage; 2 = job opportunity;

3 = other (**DESCRIBE**)

7. What is the highest level of formal education you have? **CIRCLE ONE NUMBER BELOW**

0 = none; 1 = 1st – 4th; 2 = 5th – 7th; 3 = 8th – 10th; 4 = 11th – 12th; 5 = University

8. What is your caste/tribe? _____

HOUSEHOLD CHARACTERISTICS

9. Are you head of the household? **CIRCLE: Yes = 1 No = 0, I'm his/hers:**

10. Are you living in a 1 = single or in a 2 = a joint family? **CIRCLE NUMBER: 1 2**

11. How many people live in this household in total (**INCLUDING YOU**)? _____
(number)

12. Please list the household members **excluding you**. Only first names /nicknames/initials are needed. Gender CODES Male = 1, Female = 0; Education level CODES: 0 = none; 1 = 1st – 4th;

2 = 5th – 7th; 3 = 8th – 10th; 4 = 11th – 12th; 5 = University.

Name/Nickname	Age	Gender	Formal Education Level					
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5

		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5

HOUSEHOLD INCOME and OCCUPATION

13. Which work is **household head's principal and long-term** occupation? **Do not ask, but select options while subject is answering:** 1 = agriculture; 2 = wage **labour**; 3 = livestock rearing; 4 = selling forest produce; 5 = **Forest Department labour**; 6 = other (describe)_____

14. How many persons in your household are currently employed/receiving regular salary/pension/ (**INCLUDING YOU**)? _____(number needed)

15. Including all the people in your household, how many rupees was your total household cash income last month? (**Consider** all the household members who are working)

_____ **RS. If The answer is "No income last month" ask how much person earned in last 6 months and put "6M" in front of the answer. If person reluctant to answer, write "NA"**

16. Has your total household cash income changed since 8 years ago/2006? (**CIRCLE NUMBER**)

1 = decreased, 2 = increased, 3 = no change

If changed, WHAT IS THE MAIN REASON:

HOUSEHOLD ASSETS

17. Please Indicate **how many items** your household own (number needed)

Car/Jeep/Van /___/ Tractor /___/ Animal-cart /___/ Scooter/ Motorcycle /___/
 Bicycle /___/ Radio/Transistor /___/ Television /___/ Mobile phone /___/
 Satellite dish /___/ Gas stove /___/ Kerosene stove /___/

18. Do you have electricity in your household? **CIRCLE OPTION:** Yes = 1, No = 0

19. Do you have drinking water facilities in your household?

(E.g. well or pump belonging to your household only) **CIRCLE:** Yes = 1 No = 0

20. Do you have a toilet in your household? **CIRCLE:** Yes = 1 No = 0

21. Do you have a Ration Card? **CIRCLE:** Yes = 1 No = 0

LIVESTOCK OWNERSHIP

22. Do you or people from your household own any livestock? **CIRCLE:** Yes = 1 No = 0

If the answer is NO, **GO to Q25**

23. In your household, how many do you own (number needed):

Pigs /___/ **Chicken** /___/ **Goats** /___/ (normal) **Cows** /___/ **Milch Cows** /___/ **Bulls** /___/
Buffaloes /___/

24. Where do you graze your livestock? **DO NOT ASK, JUST CIRCLE WHILE PERSON IS ANSWERING:** 1 = **Pench TR**, 2 = closest (territorial) forest, 3 = agricultural land, 5 = other area (**describe**) _____

25. When compared to 8 years ago, has livestock number changed (including chicken, pigs, cows, goats or bulls and buffaloes)? (**CIRCLE NUMBER**) **Number** 1 = decreased; 2 = increased; 3 = no change;

LAND OWNERSHIP and PROPERTY RIGHTS

26. Does your household own any land? **CIRCLE:** Yes = 1 No = 0; **IF "NO", GO TO Q:28**

27. How many acres of land does your household own? _____ **Acres**

28. Does your household lease in any land? **CIRCLE:** Yes = 1 No = 0

Adhai		Bathai	
-------	--	--------	--

29. How many acres did your household lease in this year? _____ **Acres**

30. **SKIP IF NO LAND:** Does your household **lease out** any land? **CIRCLE:** Yes = 1 No = 0

Adhai		Bathai	
-------	--	--------	--

31. **SKIP IF NO LAND:** How many acres did you household lease out this year? _____ **Acres**

32. Does your household use any land for agriculture? **CIRCLE:** Yes = 1 No = 0

33. How many acres of land does your household use for agriculture? _____ **Acres**

34. Who is the **legal owner** of the land you cultivate? 1 = you, 2 = member of the household, 3 = it is a forest land; 4 = it is a revenue land; 5 = private lease; 6 = other (describe) _____

OTHER LIVELIHOOD ACTIVITY

35. Does your household have adequate food the whole year? **CIRCLE:** 1 = Yes, during whole year; 2 = Not sufficient for the whole year, 3= other (describe) _____

36. Did your household have problems of satisfying the food needs 8 years ago?

We faced this problem: 1= Frequently; 2 = Occasionally; 3 = Rarely; 4 = Never

37. Do you or someone from your household gather forest produce? **MULTIPLE ANSWERS POSSIBLE:** 0 = none, 1 = fuel-wood; 2 = timber; 3 = tendu; 4 = mahua 5 = medicinal plants 6 = fodder, 7 = bamboo; 8 = any other NTFP (e.g. honey, char, harra, lac) (**describe**) _____

38. These forest produce you 1 = sell, 2 = use for household needs, 3 = both?

39. From which forest areas are you collecting fuel-wood, fodder or any other forest produce?

FUELWOOD: _____ How long does it take to reach there? ___ hrs ___ km

FODDER: _____ -/- ___ hrs ___ km

OTHER (SPECIFY) _____ (*location*): _____

How long does it take to reach there: **hrs** ___ **km** ___

PUT CODE below AS PERSON IS SPEAKING: 1 = PENCH TR, 2 = closest (territorial) forest, 3 = agricultural land, 4 = other

40. Which fuel does your household use for cooking?

CIRCLE: 1 = fuel-wood; 2 = LPG, 3 = Kerosene; 4 = Dung; 5 = OTHER (**describe**)

41. How much does your household use fuel-wood per day? _____ kg

42. When you compare to 8 years ago/2006, fuel-wood usage for your household needs

1 = decreased; 2 = increased; 3 = remained the same?

43. Taking everything into account, can you tell me all the SOURCES of your livelihood

- both cash and non-cash - during the past year?

(e.g.: agriculture, livestock rearing, fuel-wood and NTFP gathering, wage labour/MNREGA etc.)

If answer is in days: PUT "D" IN FRONT OF THE ANSWER

Source of livelihood:

Months/year of work:

1) _____ a) how many months per year (approx.) _____

2) _____ b) -/- _____

3) _____ c) -/- _____

4) _____ d) -/- _____

5) _____ e) -/- _____

ECO - DEVELOPMENT

44. Do you know what eco-development project is? **CIRCLE:** Yes = 1 No = 0

If answer is "NO", read the following: "Eco-development is an initiative from the Tiger Reserve authorities for the villages in the buffer zone/in surrounding zone of the Reserve"

If the answer is still "NO", GO TO Q:72

45. Are you (or someone from your family) an ED committee member? **CIRCLE:** Yes = 1 No = 0

46. Is your **HOUSEHOLD** an ED beneficiary? **CIRCLE:** Yes = 1 No = 0

If answer is "NO" GO to Q51

47. Please list which benefits your household received from ED (including micro-loans if any):

1= _____ Which Year? _____ 2= _____ Which year? _____

3= _____ Which Year? _____ 4= _____ Which Year? _____

5= _____ Which Year? _____ 6= _____ Which Year? _____

48. Have your household got the assets or items you requested from EDC?

CIRCLE: Yes = 1 No = 0

49. Does your household utilize these provisions? **DON'T READ OPTIONS,**

CIRCLE WHILE PERSON IS ANSWERING: 1 = Yes 2 = No, I've sold them; 3 = No, I've gifted them; 4 = OTHER _____

50. How useful/needed are those items for your household?

Not useful at all	Not useful	Useful	Very useful	Don't know
1	2	3	4	6

51. Have you or someone from your household got **EMPLOYED** under the ED project?
READ TO THE RESPONDENT. YOU MAY CIRCLE MORE THAN 1 OPTION: 0 = NO EMPLOYEMENT; 1 = tourist guide; 2 = driver for tourists; 3 = patrolling with the FD; 4 = OTHER (**describe**):

If the person hasn't got employment through ED, GO TO Q54

52. Which year you or someone from your household got the employment?

1= _____ Which Year? _____ 2= _____ Which Year? _____

3= _____ Which Year? _____ 4= _____ Which Year? _____

53. Is the occupation you/some from your family received under Eco-development, sufficient to support you and your family? **CIRCLE:** Yes = 1, No = 0

54. Has your **VILLAGE** received any help through Eco-Development project?

CIRCLE: Yes = 1 No = 0 Don't know = 2

If the answer is NO or Don't know, GO TO Q58

55. What provisions your **VILLAGE** got?

1= _____ Year? _____ 2= _____ Year? _____

3= _____ Year? _____ 4= _____ Year? _____

—

5= _____ Year? _____ 6= _____ Year? _____

—

56. How useful/needed are those provisions for your village?

Not useful at all	Not useful	Useful	Very useful	Don't know
1	2	3	4	6

57. In your opinion, how does the village use and maintain those provisions?

Very badly	Badly	Neither well not bad	Well	Very well	Don't know
1	2	3	4	5	6

58. In your opinion, who does MOSTLY benefit from Eco-Development project?

You may choose only one option from below.

0 = Don't Know; 1 = Forest and Wildlife; 2 = Your household; 3 = Your village; 4 = Important people in the village; 5 = Forest Department; 6 = No one; 7 = OTHER (describe)_____

59. Do you know **WHY** are provisions being given through Eco-Development project?

DON'T READ, CHOOSE ONLY 1 OPTION WHILE PERSON IS SPEAKING

0 = Don't know; 1 = to reduce pressure on forest; 2 = OTHER (DESCRIBE)_____;

60. Are there ED committee meetings in this village?

0 = No meetings at all; 1 = I'm not aware if there are meetings; 2 = Yes, but meeting schedule is not fixed, 3 = Yes and meeting schedule is fixed to _____ a year/month; 4 = Yes, but I don't know the meeting schedule; 5 = Other:

IF "NO MEETINGS AT ALL", GO TO Q:68

61. If there are meetings, are you (or someone from your family) attending them?

CIRCLE: Yes = 1, No = 0

>>> IF "NO": GO TO Q:62, IF "YES": GO TO Q:63 <<<

62. If NO, why are you (or someone from your family) not attending the meetings?

DO NOT READ, CIRCLE WHILE RESPONDENT IS ANSWERING:

1 = my voice cannot be heard, so why should I come; 2 = no provisions, so why should I come;

3 = I don't trust committee members; 4 = I am not invited; 5 = OTHER
(describe) _____

>>> **SKIP Q: 63 to 67 and GO TO Q:68** <<<

63. If YES, how many meetings have you (or someone from your family) attended in the last 12 months? _____ (number)

64. Do you (or someone from your family) have opportunity to speak during these meetings?

Always	Very frequently	Occasionally	Sometimes But Infrequently	Never
5	4	3	2	1

65. Do you feel that opinion of yours or of someone from your family that attend meeting can be heard during the meetings? **CIRCLE:** Yes = 1 No = 0

66. Do you think the way in which decisions are made during the ED meetings and within committee members is **fair/just**? I'm referring to decisions regarding demand or distribution of ED provisions **CIRCLE:** Yes = 1 No = 0 Don't know = 2

67. Are you and your family **sufficiently informed** about the decisions during the ED meetings regarding demand or distribution of ED provisions? **CIRCLE:** Yes = 1 No = 0 Don't know = 2

68. Has **Eco-development project** in last 8 years caused any of the following (see below). **Circle the number: 1 = worsened/decreased; 2 = improved/increased; 3 = no change; 4 = don't know**

1. Development of your village?	1 3	2 4
2. Economic status of you and/or your family?	1 3	2 4
3. Dependency of your household on the forest produce?	1 3	2 4
4. Level of village cooperation with the Forest Department on fire control?	1 3	2 4
5. Frequency of reporting of illegal activities by village to FD?	1 3	2 4
6. Level of your satisfaction with the Forest Department?	1 3	2 4
7. Level of your trust in Forest Department to work in the interest of you and your village?	1 3	2 4

69. Please list all the GOOD SIDES OF ECO-DEVELOPMENT according to your opinion?

DON'T READ the OPTIONS: 0 = don't know; 1 = no good sides; 2 = other (describe):

70. Please list all the BAD SIDES OF ECO-DEVELOPMENT according to your opinion?

DON'T READ the OPTIONS: 0 = don't know; 1 = no bad sides; 2 = other (describe):

71. What is your overall perception about ED?

Very negative	Negative	Neither negative nor positive	Positive	Very positive	Don't know
1	2	3	4	5	6

134. Is there anything you would like to change in how eco-development committee operates? **(describe)**

TIGER RESERVE

72. Do you know about the [NAME] Tiger Reserve (incl. Park and Sanctuary)?

CIRCLE: Yes = 1 No = 0 >>>> IF NO, ASK ABOUT *PARK or SANCTUARY*

73. What are the advantages of living next to Tiger Reserve (incl. Park and Sanctuary)? **Please describe. DON'T READ, CIRCLE WHILE RESPONDENT IS ANSWERING**

0 = no advantages, 1 = don't know, 2 = too far to get advantages; 3 = OTHER (list below):

74. What are the disadvantages of living next to tiger reserve? **Please describe**

DON'T READ, CIRCLE WHILE RESPONDENT IS ANSWERING

0 = no disadvantages; 1= don't know; 2 = crop loss due to wild animals; 3 =OTHER (List below):

75. Have you ever being disturbed by the wild animals? **MULTIPLE ASNWERS POSSIBLE:**
0 = NO,

1 = Wild animals destroyed your crops, 2 = Attacked and/or killed your livestock; 3 = Injured you or a member of your family; 4 = OTHER **(describe)**

76. If **YES**, how frequently are you being disturbed by the wild animals?

A = during specific season (e.g. crop, scarcity of water in forest) ----- *B* = all year long

1 = every day; 2 = twice a week; 3 = once a week; 4 = twice a month; 5 = once a month;
6 = twice a year 7 = other (describe) _____

77. Has the number of experiences of disturbance due to wild animals changed since past 8 years?

CIRCLE: 1 = decreased; 2 = increased; 3 = Haven't changed

78. Have you received compensation for disturbances caused by the wild animals? 1 = Yes, whenever I applied I got; 2 = yes, I applied but I only get compensation sometimes, 3 = no, I applied but never got; 4 = no, I never applied for compensation

LEGAL AWARENESS

79. Do you know clearly where are the boundaries of the core zone of the Tiger Reserve (incl. Park and Sanctuary)? **CIRCLE:** Yes = 1 No = 0

80. Can you please describe what is your understanding of the "buffer zone" concept?

81. Do you know clearly where are the boundaries of the buffer zone of the Tiger reserve?

CIRCLE: Yes = 1 No = 0

82. Which activities are **banned** in the Tiger Reserve? Please briefly describe

1) Core (incl. Park and Sanctuary): _____

2) Buffer/surrounding forests:

83. In case you are forced to do these (banned) activities to get forest resources for you and your household, what would you do? **DO NOT READ OPTIONS BELOW, JUST SELECT ONE WHILE THE RESPONDENT IS SPEAKING** 0 = nothing; 1 = ask FD permission; 2 = go illegal; 3=bribe; 4=other (**describe**)

84. Why do you think these activities are restricted in the Tiger reserve? Please describe

1) Core (incl. Park and Sanctuary): _____

2) Buffer/surrounding forests: _____

85. Which activities are **allowed** in the Tiger Reserve? Please describe

1) Core (incl. Park and Sanctuary) _____

2) Buffer/surrounding forests: _____

86. Do you know which rights are provided through **Forest (Tribal) Right Act**?

0 = I don't know about the ACT; 1 = I know about the following rights of this Act:

(DON'T READ THE OPTIONS, JUST Circle WHILE PERSON IS ANSWERING:

1) Individual property rights; 2) community rights/nistar; 3) access to forest produce; 4) right to protect common forest land; 5) ANY OTHER: _

87. Have you applied for the provisions of this Act? **CIRCLE:** Yes = 1 No = 0

BIODIVERSITY CONDITION IN THE TIGER RESERVE: core and buffer

88. Please rate the **current overall condition of the forest** in the Tiger Reserve (incl. Park and Sanctuary) on the scale from 1 to 5: 1 means forest is in very bad condition, and 5 means forest is in very good condition.

/ ___ / **Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone.**

	Very bad	Bad	Neither bad nor good	Good	Very good	Don't know
NTFP	1	2	3	4	5	6
Fuel-wood	1	2	3	4	5	6
Forest density	1	2	3	4	5	6
Fodder	1	2	3	4	5	6

89. What factors do you think have led to the current state of the forest?

90. In your opinion, overall condition of the forest in the Tiger Reserve since 8 years ago has:

NTFP 1 = Decreased, 2= Increased, 3 = Haven't changed

Fuelwood 1 = Decreased, 2= Increased, 3 = Haven't changed

Forest density 1 = Decreased, 2= Increased, 3 = Haven't changed

Fodder 1 = Decreased, 2= Increased, 3 = Haven't changed

/ ___ / Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone

91. If the condition of the forest in the Tiger Reserve **has changed** in comparison to 8 years ago, whether this change affected your household? CIRCLE: YES = 1 NO = 0 Don't know = 2

IF NO or DON'T KNOW, GO TO **Q:93**

92. Which positive or negative effects has your household experienced from these changes?

93. Please rate the **current abundance of wildlife (animals)** in the forest in the Tiger Reserve.

/ ___ / Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone

Very scarce	Scarce	Neither scarce nor abundant	Abundant	Very abundant	Don't know
1	2	3	4	5	6

94. In your opinion, the abundance of wildlife in the forest of the Tiger Reserve since 8 years ago has:

1 = Decreased, 2= Increased, 3 = Haven't changed

/ ___ / Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone

95. How much do you like or dislike:

	Strongly dislike	Dislike	Neither like nor dislike	Like	Like very much	Don't know
Forest	1	2	3	4	5	6
Tiger	1	2	3	4	5	6
Other wild animals	1	2	3	4	5	6

96. In the past 12 months, can you tell how many people have you seen collecting resources from this Tiger Reserve (including collection of fuel wood, fodder, medicinal plants, livestock grazing, hunting and fishing)?

Very few	Few	Some	Many	A great deal;	Don't know
1	2	3	4	5	6

97. Compared to 8 years ago, do you observe more or less people collecting resources from this Tiger reserve? **Number of people:**

1 = Decreased, 2= Increased, 3 = Haven't changed

98. In the past 12 months, how frequently had a forest officer stopped people from your village from entering the Reserve to collect forest produce, to graze livestock, to hunt or fish? /___/ **Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone**

Very Rarely	Rarely	Occasionally	Frequently	Very Frequently	Don't know
1	2	3	4	5	6

99. Compared to 8 years ago, do you think the forest officers are stopping people more or less frequently from entering Tiger Reserve to collect forest produce, to graze livestock, to hunt or fish? /___/ **Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone**

Frequency: 1 = Decreased, 2= Increased, 3 = Haven't changed

100. What do you think about the current type of conservation measures in this Tiger Reserve?

Circle number in front of **only one answer**.

1 = Too restrictive, more access to forest should be allowed

2 = About the right level of the law enforcement and conservation

3 = Too lax, too many people are entering the Reserve and jeopardizing its future

101. What would be the most effective way to preserve forest and wildlife of this Tiger Reserve?

1 = Strong law enforcement by Forest Department only through constant patrolling in the Reserve

2 = Collaboration between local people and Forest Department with a combination of law enforcement and local people participation

3 = Community-based participatory management with ONLY local people as stewards of the Reserve

4 = Other

(describe) _____

102. Taking everything into account, how much are you satisfied with the Tiger Reserve Management Authority?

Very unsatisfied	Unsatisfied	Neither satisfied nor unsatisfied	Satisfied	Very satisfied	Don't know
1	2	3	4	5	6

103. Has your level of satisfaction with the Tiger Reserve Management Authority since 2006/8 years ago **1 = decreased; 2 = increased, 3 = haven't changed, 4 = don't know?**

104. How much do you trust the Tiger Reserve Management Authority to work in your interest?

Not at all	Not very much	Neither trust nor distrust	A fair amount	A lot	Don't know
1	2	3	4	5	6

105. In the past 8 years, has the level of trust towards Tiger Reserve Management Authority to work in your **interest 1 = worsened, 2 = improved or 3 = remained the same?**

106. Has the accountability of Tiger Reserve Management Authority changed since 8 years ago/2006? By “**accountability**”/”**responsibility**” I mean justifications of actions or decisions to you. **CIRCLE: 1 = Decreased, 2= Increased, 3 = Haven't changed, 4 = Don't know**

INSTITUTIONS and SOCIAL CAPITAL

107. Are you or someone from your family a member of any groups/associations in the village?

0 = NONE; 1 = **SHG**; 2 = MP Forest Department groups, 3 = **LAMPS**; 4 = other groups related to forest use/conservation (describe)_____; 5 = Panchyat; 6 = Other (describe):_____

If NONE, SKIP TO Q:109

108. How frequently are you attending meetings of those groups (**Write 0 if no answer**):

Group?	
---------------	--

1= _____ How Frequently? _____ a month/a year (circle as appropriate)
2= _____ How Frequently? _____ a month/a year (circle as appropriate)
3= _____ How Frequently? _____ a month/a year (circle as appropriate)

109. In the past 12 months, have you done the following (**circle number, multiple options possible**)

- 1 = Attended a village meeting
- 2 = Carried out voluntary/unpaid work
- 3 = Participated in any other community association
- 4 = Took positive action about a local issue (e.g. improving the local environment, campaigning on local issues, organizing a local event)?
- 5 = Have done a favour for a neighbour
- 6 = Voted in the last election

110. Would you say that most people in this village could be trusted to work in your interest?

Not at all	Not very much	I neither trust nor distrust	A fair amount	A lot	Don't know
1	2	3	4	5	6

111. Would you say that village leaders could be trusted to work in your interest?

Not at all	Not very much	I neither trust nor distrust	A fair amount	A lot	Don't know
1	2	3	4	5	6

112. Has the accountability of **village leaders/heads** changed since 8 years ago/2006?

By “**accountability/responsibility**” I mean justification of actions or decisions. **CIRCLE**: 1 = Decreased, 2 = Increased, 3 = Haven’s changed

THANK YOU VERY MUCH FOR HAVING PARTICIPATED IN THIS SURVEY!

- Please make sure all the questions are answered. -

Do you have any comments?

Time interview ENDED: ____:____

Who was else present during the interview?

FOR ENUMERATOR: Please write down all the important notes and observations during the interview

ANNEX 14: QUESTIONNAIRES FOR THE LOCAL COMMUNITY: JOINT FOREST MANAGEMENT

SURVEY FOR THE VILLAGES UNDER JOINT FOREST MANAGEMENT

Questionnaire Code: _____	Check 1 ___ Check 2 ___ Entered ___
---------------------------	-------------------------------------

BEFORE YOU START: PLEASE READ THE TEXT BELOW TO EVERY RESPONDENT

*My name is [full name of enumerator]. I am here on behalf of **Biljana Macura** who is collecting information for her studies. She is a PhD Student and researcher at University of Padova in Italy. Her research is about Tiger reserves governance and welfare of local communities.*

Participation in this research is entirely voluntary. If you choose to take part in the survey your name will not be recorded and your answers will not be shared under any circumstances with other villagers or the authorities. The findings of this research will appear in aggregated form only. This survey will take approximately 1 hour. You shall not directly benefit from this survey, but it is hoped that thanks to it, a better management of the reserve is achieved. Would you like to continue with the questions?

PLEASE FILL IN THE INFORMATION BELOW PRIOR TO THE INTERVIEW. DO NOT ASK.

Date / ___ / ___ / 14	Interview started at ___:___
Enumerator's Initials:	Unique respondent's ID _____
Village:	Panchayat
Hamlet:	
Distance of the household to the village center (approx.): _____ m _____ min	Distance of the household to the nearest forested area (approx.): _____ m _____ min

ED implemented in the village? YES NO	JFM implemented in the village? YES NO
--	---

PLEASE FILL IN THE INFORMATION BELOW PRIOR TO THE INTERVIEW. DO NOT ASK.

House Walls: 1 = Mud; (putai ___ w/o putai ___) 2 = Burnt bricks (cement plaster __ w/o plaster __); 3 = Other material
(describe) _____

Roof: 1 = Thatch / grass/bamboo; 2 = Iron / metal/asbestos sheets;
3 = Tiles; 4 = Other material **(describe)** _____

Floor: 1 = Mud; 2 = Floor tiles; 3 = Cement; 4 = Other material
(describe) _____

ASK FOLLOWING QUESTIONS:

1. What is your first name (or nickname)? **Surname is not needed!** _____
2. Gender **CIRCLE:** Male = 1, Female = 0
3. What is your age? _____ **(IF UNSURE, ADD 900 TO THE AGE. E.G. APPROX. 30 = 930)**
4. How long have you lived in this village? _____ Years

IF ALL HIS/HER LIFE, WRITE DOWN RESPONDENT AGE. IF IN MONTHS ADD "M" IN FRONT OF THE NUMBER - >> GO TO Q7 if person is not an immigrant

5. Where have you lived before? Indicate the Tehsil: _____
6. Why immigrated here? **CIRCLE:** 1 = marriage; 2 = job opportunity;
3 = other **(DESCRIBE)**

7. What is the highest level of formal education you have? **CIRCLE ONE NUMBER BELOW**

0 = none; 1 = 1st – 4th; 2 = 5th – 7th; 3 = 8th – 10th; 4 = 11th – 12th; 5 = University

8. What is your caste/tribe? _____

HOUSEHOLD CHARACTERISTICS

9. Are you head of the household? **CIRCLE: Yes = 1 No = 0, I'm his/hers:**

10. Are you living in a 1 = single or in a 2 = a joint family? **CIRCLE NUMBER: 1 2**

11. How many people live in this household in total (**INCLUDING YOU**)? _____
(number)

12. Please list the household members **excluding you**. Only first names /nicknames/initials are needed. Gender CODES Male = 1, Female = 0; Education level CODES: 0 = none; 1 = 1st – 4th;

2 = 5th – 7th; 3 = 8th – 10th; 4 = 11th – 12th; 5 = University.

Name/Nickname	Age	Gender	Formal Education Level					
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5

		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5
		1 0	0	1	2	3	4	5

HOUSEHOLD INCOME and OCCUPATION

13. Which work is **household head’s principal and long-term** occupation? **Do not ask, but select options while subject is answering:** 1 = agriculture; 2 = wage labour; 3 = livestock rearing; 4 = selling forest produce; 5 = **Forest Department labour**; 6 = other (describe) _____

14. How many persons in your household are currently employed/receiving regular salary/pension/ (**INCLUDING YOU**)? _____ (number needed)

15. Including all the people in your household, how many rupees was your total household cash income last month? (**Consider** all the household members who are working)

_____ **RS. If The answer is “No income last month” ask how much person earned in last 6 months and put “6M” in front of the answer. If person reluctant to answer, write “RA”**

16. Has your total household cash income changed since 8 years ago/2006? (**CIRCLE NUMBER**)

1 = decreased, 2 = increased, 3 = no change

If changed, WHAT IS THE MAIN REASON:

HOUSEHOLD ASSETS

17. Please Indicate **how many items** your household own (number needed)

Car/Jeep/Van / ___ / **Tractor** / ___ / **Animal-cart** / ___ / **Scooter/ Motorcycle** / ___ / **Bicycle** / ___ / **Radio/Transistor** / ___ / **Television** / ___ / **Mobile phone** / ___ / **Satellite dish** / ___ / **Gas stove** / ___ / **Kerosene stove** / ___ /

18. Do you have electricity in your household? **CIRCLE OPTION:** Yes = 1, No = 0

19. Do you have drinking water facilities in your household?

(E.g. well or pump belonging to your household only) **CIRCLE:** Yes = 1 No = 0

20. Do you have a toilet in your household? **CIRCLE:** Yes = 1 No = 0

21. Do you have a Ration Card? **CIRCLE:** Yes = 1 No = 0

LIVESTOCK OWNERSHIP

22. Do you or people from your household own any livestock? **CIRCLE:** Yes = 1 No = 0

If the answer is NO, GO to Q25

23. In your household, how many do you own (number needed):

Pigs / ___ / **Chicken** / ___ / **Goats** / ___ / (normal) **Cows** / ___ / **Milch Cows** / ___ / **Bulls**
/ ___ / **Buffaloes** / ___ /

24. Where do you graze your livestock? **DO NOT ASK, JUST CIRCLE WHILE PERSON IS ANSWERING:** 1 = **Pench TR**, 2 = closest (territorial) forest, 3 = agricultural land, 5 = other area (**describe**) _____

25. When compared to 8 years ago, has livestock number changed (including chicken, pigs, cows, goats or bulls and buffaloes)? (**CIRCLE NUMBER**) **Number** 1 = decreased; 2 = increased; 3 = no change;

LAND OWNERSHIP and PROPERTY RIGHTS

26. Does your household own any land? **CIRCLE:** Yes = 1 No = 0; **IF "NO", GO TO Q:28**

27. How many acres of land does your household own? _____ **Acres**

28. Does your household lease in any land? **CIRCLE:** Yes = 1
No = 0

Adhai		Bathai	
-------	--	--------	--

29. How many acres did your household lease in this year? _____ **Acres**

30. **SKIP IF NO LAND:** Does your household **lease out** any land? **CIRCLE:** Yes = 1 No = 0

Adhai		Bathai	
-------	--	--------	--

31. **SKIP IF NO LAND:** How many acres did you household lease out this year?
_____ **Acres**

32. Does your household use any land for agriculture? **CIRCLE:** Yes = 1 No = 0

33. How many acres of land does your household use for agriculture? _____ **Acres**

34. Who is the **legal owner** of the land you cultivate? 1 = you, 2 = member of the household,
3 = it is a forest land; 4 = it is a revenue land; 5 = private lease; 6 = other (describe)

OTHER LIVELIHOOD ACTIVITY

35. Does your household have adequate food the whole year? **CIRCLE:** 1 = Yes, during whole year; 2 = Not sufficient for the whole year, 3= other (describe) _____

36. Did your household have problems of satisfying the food needs 8 years ago?

We faced this problem: 1= Frequently; 2 = Occasionally; 3 = Rarely; 4 = Never

37. Do you or someone from your household gather forest produce? **MULTIPLE ANSWERS POSSIBLE:** 0 = none, 1 = fuel-wood; 2 = timber; 3 = tendu; 4 = mahua 5 = medicinal plants 6 = fodder, 7 = bamboo; 8 = any other NTFP (e.g. honey, char, harra, lac) (**describe**) _____

38. These forest produce you 1 = sell, 2 = use for household needs, 3 = both?

39. From which forest areas are you collecting fuel-wood, fodder or any other forest produce?

FUELWOOD: _____ How long does it take to reach there? ___ hrs ___ km

FODDER: _____ -/- ___ hrs ___ km

OTHER (SPECIFY) _____ (location): _____

How long does it take to reach there: **hrs** ___ **km** ___

PUT CODE below AS PERSON IS SPEAKING: 1 = Pench TR, 2 = closest (territorial) forest, 3 = agricultural land, 4 = other

40. Which fuel does your household use for cooking?

CIRCLE: 1 = fuel-wood; 2 = LPG, 3 = Kerosene; 4 = Dung; 5 = OTHER (**describe**)

41. How much does your household use fuel-wood per day? _____ kg

42. When you compare to 8 years ago/2006, fuel-wood usage for your household needs

1 = decreased; 2 = increased; 3 = remained the same?

43. Taking everything into account, can you tell me all the SOURCES of your livelihood

- both cash and non-cash - during the past year?

(e.g.: agriculture, livestock rearing, fuel-wood and NTFP gathering, wage labour/MNREGA etc.)

If answer is in days: PUT "D" IN FRONT OF THE ANSWER

Source of livelihood:

Months/year of work:

1) _____ a) how many months per year (approx.) _____

2) _____ b) -/- _____

3) _____ c) -/- _____

4) _____ d) -/- _____

5) _____ e) -/- _____

JOINT FOREST MANAGEMENT AND FOREST PROTECTION COMMITTEES

113. Do you know what **JOINT FOREST MANAGEMENT (JFM)** is? **CIRCLE:** Yes = 1
No = 0

114. Do you know what **Forest Protection Committees (FPC)** are? **CIRCLE:** Yes = 1 No
= 0

115. Are you (or someone from your family) **Forest Protection Committee** member?
CIRCLE: Yes = 1 No = 0

116. Through JFM/FPC have you or your household received any of the following:

YOU MAY CIRCLE MORE THAN 1 OPTION: 0=nothing, 1 = household utensils;
2 = access to NTFP; 3 = any other (describe)_____

117. Have you or someone from your household got **EMPLOYED** under the
JFM/FPC?:

**Don't READ TO THE RESPONDENT. YOU MAY CIRCLE MORE THAN 1
OPTION:**

0 = NO EMPLOYEMENT; 1 = patrolling with the FD; 2 = OTHER (**describe**)

If the person hasn't got employment through ED, GO TO Q119

118. Is the occupation you received under JFM/FPC sufficient to support you and
your family? **CIRCLE:** Yes = 1, No = 0

119. Has your village received through JFM/FPC following: **CIRCLE:** 0 = nothing; 1=
share of revenue from the forest operations; 2 = common buildings, roads, etc 3 = pond,
wells, field banding, irrigation facilities; 4= other _____; 5 = don't
know;

120. In your opinion, who does MOSTLY benefit from JFM/FPC?

You may choose only one option from below.

0 = Don't Know; 1 = Forest and Wildlife; 2 = Your household; 3 = Your village; 4 =
Important people in the village; 5 = Forest Department; 6 = No one; 7 = OTHER
(describe)_____

121. Are there FPC meetings in this village?

0 = No meetings at all; 1 = I'm not aware if there are meetings; 2 = Yes, but meeting schedule is not fixed, 3 = Yes and meeting schedule is fixed to _____ a year/month; 4 = Yes, but I don't know the meeting schedule; 5 = Other:

122. If there are meetings, are you or someone from your family attending them?

CIRCLE: Yes = 1, No = 0

>>> **IF "NO": GO TO Q:123, IF "YES": GO TO Q:124** <<<

123. If NO, why are you or someone from your family not attending the meetings?

DO NOT READ, ONLY CIRCLE WHILE RESPONDENT IS ANSWERING. Multiple answers possible 1 = my voice cannot be heard so why should I come; 2 = no provisions so why should I come; 3 = I don't trust committee members; 4 = I am not invited; 5 = OTHER (describe)_____

>>> **SKIP Q: 124 to 126 and GO TO Q:127** <<<

124. If YES, how many meetings have you or someone from your family attended in the last 12 months? _____ (number)

125. Do you or someone from your family have opportunity to speak during these meetings?

Always	Very frequently	Occasionally	Sometimes But Infrequently	Never
5	4	3	2	1

126. Do you feel that opinion of yours or of someone from your family can be heard during the meetings? **CIRCLE:** Yes = 1 No = 0

127. Do you think the way in which decisions are made during the FPC meetings and within committee members is **fair/just**? I'm referring to decisions regarding revenue sharing, access to NTFP, distribution of household assets, etc **CIRCLE:** Yes = 1 No = 0 Don't know = 2

128. Are you and your family **sufficiently informed** about the decisions during the FPC meetings? I'm referring to decisions regarding revenue sharing, access to NTFP, distribution of household assets, etc. **CIRCLE**: Yes = 1 No = 0 Don't know = 2

129. Have JFM/FDC in last 8 years caused any of the following:

CIRCLE THE NUMBER: 1 = worsened/decreased; 2 = improved/increased; 3 = no change; 4 = don't know	
1. Development of your village?	1 2 3 4
2. Economic status of you and/or your family?	1 2 3 4
4. Level of village cooperation with the Forest Department on fire control?	1 2 3 4
5. Frequency of reporting of illegal activities by village to FD?	1 2 3 4
6. Level of your satisfaction with the Forest Department?	1 2 3 4
7. Level of your trust in Forest Department to work in the interest of you and your village?	1 2 3 4

130. Please list all the GOOD SIDES OF JFM/FPC according to your opinion?

DON'T READ the OPTIONS: 0 = don't know; 1 = no good sides; 2 = other (describe):

131. Please list all the BAD SIDES OF JFM/FPC according to your opinion?

DON'T READ the OPTIONS: 0 = don't know; 1 = no bad sides; 2 = other (describe):

132. What is your overall perception about JFM/FPC??

Very negative	Negative	Neither negative nor positive	Positive	Very positive	Don't know
1	2	3	4	5	6

133. Is there anything you would like to change in how JFM/FPC operates? (**describe**)

TIGER RESERVE

72. Do you know about the [NAME] Tiger Reserve (incl. Park and Sanctuary)?

CIRCLE: Yes = 1 No = 0 >>>> IF **NO**, ASK ABOUT **PARK or SANCTUARY**

73. What are the advantages of living next to Tiger Reserve (incl. Park and Sanctuary)? **Please describe. DON'T READ, CIRCLE WHILE RESPONDENT IS ANSWERING**

0 = no advantages, 1 = don't know, 2 = too far to get advantages; 3 = OTHER (list below):

74. What are the disadvantages of living next to tiger reserve? **Please describe**

DON'T READ, CIRCLE WHILE RESPONDENT IS ANSWERING

0 = no disadvantages; 1= don't know; 2 = crop loss due to wild animals; 3 =OTHER (List below):

75. Have you ever being disturbed by the wild animals? **MULTIPLE ANSWERS POSSIBLE:**
yes =1 0 = NO; **IF yes, how?**

1 = Wild animals destroyed your crops, 2 = Attacked and/or killed your livestock; 3 = Injured you or a member of your family; 4 = OTHER (**describe**)

76. **If YES**, how frequently are you being disturbed by the wild animals?

A = during specific season (e.g. crop, scarcity of water in forest) ----- *B* = all year long

1 = every day; 2 = twice a week; 3 = once a week; 4 = twice a month; 5 = once a month;

6 = twice a year 7 = other (describe) _____

77. Has the number of experiences of disturbance due to wild animals changed since past 8 years?

CIRCLE: 1 = decreased; 2 = increased; 3 = Haven't changed

78. Have you received compensation for disturbances caused by the wild animals? 1 = Yes, whenever I applied I got; 2 = yes, I applied but I only get compensation sometimes, 3 = no, I applied but never got; 4 = no, I never applied for compensation

LEGAL AWARENESS

79. Do you know clearly where are the boundaries of the core zone of the Tiger Reserve (incl. Park and Sanctuary)? **CIRCLE:** Yes = 1 No = 0

80. Can you please describe what is your understanding of the “buffer zone” concept?

81. Do you know clearly where are the boundaries of the buffer zone of the Tiger reserve?

CIRCLE: Yes = 1 No = 0

82. Which activities are **banned** in the Tiger Reserve? Please briefly describe

1) Core (incl. Park and Sanctuary): _____

2) Buffer/surrounding forests: _____

83. In case you are forced to do these (banned) activities to get forest resources for you and your household, what would you do? **DO NOT READ OPTIONS BELOW, JUST SELECT ONE WHILE THE RESPONDENT IS SPEAKING** 0 = nothing; 1 = ask FD permission; 2 = go illegal; 3=bribe; 4=other (**describe**)

84. Why do you think these activities are restricted in the Tiger reserve? Please describe

1) Core (incl. Park and Sanctuary): _____

2) Buffer/surrounding forests: _____

85. Which activities are **allowed** in the Tiger Reserve? Please describe

1) Core (incl. Park and Sanctuary) _____

2) Buffer/surrounding forests: _____

86. Do you know which rights are provided through **Forest (Tribal) Right Act**?

0 = I don't know about the ACT; 1 = I know about the following rights of this Act:

(DON'T READ THE OPTIONS, JUST Circle WHILE PERSON IS ANSWERING:

1) Individual property rights; 2) community rights/nistar; 3) access to forest produce; 4) right to protect common forest land; 5) ANY OTHER: _

87. Have you applied for the provisions of this Act? **CIRCLE:** Yes = 1 No = 0

BIODIVERSITY CONDITION IN THE TIGER RESERVE: core and buffer

88. Please rate the **current overall condition of the forest** in the Tiger Reserve (incl. Park and Sanctuary) on the scale from 1 to 5: 1 means forest is in very bad condition, and 5 means forest is in very good condition.

/___/ **Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone.**

	Very bad	Bad	Neither bad nor good	Good	Very good	Don't know
NTFP	1	2	3	4	5	6
Fuel-wood	1	2	3	4	5	6
Forest density	1	2	3	4	5	6
Fodder	1	2	3	4	5	6

89. What factors do you think have led to the current state of the forest?

90. In your opinion, overall condition of the forest in the Tiger Reserve since 8 years ago has:

NTFP 1 = Decreased, 2= Increased, 3 = Haven't changed

Fuelwood 1 = Decreased, 2= Increased, 3 = Haven't changed

Forest density 1 = Decreased, 2= Increased, 3 = Haven't changed

Fodder 1 = Decreased, 2= Increased, 3 = Haven't changed

/ ___ / **Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone**

91. If the condition of the forest in the Tiger Reserve **has changed** in comparison to 8 years ago, whether this change affected your household? CIRCLE: YES = 1 NO = 0 Don't know = 2

IF **NO** or **DON'T KNOW**, GO TO **Q:93**

92. Which positive or negative effects has your household experienced from these changes?

93. Please rate the **current abundance of wildlife (animals)** in the forest in the Tiger Reserve.

Very scarce	Scarce	Neither scarce nor abundant	Abundant	Very abundant	Don't know
1	2	3	4	5	6

94. In your opinion, the abundance of wildlife in the forest of the Tiger Reserve since 8 years ago has:

1 = Decreased, 2= Increased, 3 = Haven't changed

95. How much do you like or dislike:

	Strongly dislike	Dislike	Neither like nor dislike	Like	Like very much	Don't know
--	------------------	---------	--------------------------	------	----------------	------------

Forest	1	2	3	4	5	6
Tiger	1	2	3	4	5	6
Other wild animals	1	2	3	4	5	6

96. In the past 12 months, can you tell how many people have you seen collecting resources from this Tiger Reserve (including collection of fuel wood, fodder, medicinal plants, livestock grazing, hunting and fishing)?

Very few	Few	Some	Many	A great deal;	Don't know
1	2	3	4	5	6

97. Compared to 8 years ago, do you observe more or less people collecting resources from this Tiger reserve? **Number of people:**

1 = Decreased, 2= Increased, 3 = Haven't changed

98. In the past 12 months, how frequently had a forest officer stopped people from your village from entering the Reserve to collect forest produce, to graze livestock, to hunt or fish? /___/

Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone

Very Rarely	Rarely	Occasionally	Frequently	Very Frequently	Don't know
1	2	3	4	5	6

99. Compared to 8 years ago, do you think the forest officers are stopping people more or less frequently from entering Tiger Reserve to collect forest produce, to graze livestock, to hunt or fish? /___/ **Tick this box if the respondent doesn't know about the Tiger reserve/core zone but refers to the forest of the buffer/forest surrounding core zone**

Frequency: 1 = Decreased, 2= Increased, 3 = Haven't changed

100. What do you think about the current type of conservation measures in this Tiger Reserve?

Circle number in front of **only one answer**.

1 = Too restrictive, more access to forest should be allowed

2 = About the right level of the law enforcement and conservation

3 = Too lax, too many people are entering the Reserve and jeopardizing its future

101. What would be the most effective way to preserve forest and wildlife of this Tiger Reserve?

1 = Strong law enforcement by Forest Department only through constant patrolling in the Reserve

2 = Collaboration between local people and Forest Department with a combination of law enforcement and local people participation

3 = Community-based participatory management with ONLY local people as stewards of the Reserve

4 = Other

(describe)_____

102. Taking everything into account, how much are you satisfied with the Tiger Reserve Management Authority?

Very unsatisfied	Unsatisfied	Neither satisfied nor unsatisfied	Satisfied	Very satisfied	Don't know
1	2	3	4	5	6

103. Has your level of satisfaction with the Tiger Reserve Management Authority since 2006/8 years ago **1 = decreased; 2 = increased, 3 = haven't changed, 4 = don't know?**

104. How much do you trust the Tiger Reserve Management Authority to work in your interest?

Not at all	Not very much	Neither trust nor distrust	A fair amount	A lot	Don't know
1	2	3	4	5	6

105. In the past 8 years, has the level of trust towards Tiger Reserve Management Authority to work in your **interest 1 = worsened, 2 = improved or 3 = remained the same?**

106. Has the accountability of Tiger Reserve Management Authority changed since 8 years ago/2006? By “**accountability**”/”**responsibility**” I mean justifications of actions or decisions to you. **CIRCLE: 1 = Decreased, 2= Increased, 3 = Haven’t changed, 4 = Don't know**

INSTITUTIONS and SOCIAL CAPITAL

107. Are you or someone from your family a member of any groups/associations in the village?

0 = NONE; 1 = **SHG**; 2 = MP Forest Department groups, 3 = **LAMPS**; 4 = other groups related to forest use/conservation (describe) _____; 5 = Panchyat; 6 = Other (describe): _____

If NONE, SKIP TO Q:109

108. How frequently are you attending meetings of those groups (**Write 0 if no answer**):

Group?	
1= _____	How Frequently? _____ a month/a year (circle as appropriate)
2= _____	How Frequently? _____ a month/a year (circle as appropriate)
3= _____	How Frequently? _____ a month/a year (circle as appropriate)

109. In the past 12 months, have you done the following (**circle number, multiple options possible**)

- 1 = Attended a village meeting
- 2 = Carried out voluntary/unpaid work
- 3 = Participated in any other community association
- 4 = Took positive action about a local issue (e.g. improving the local environment, campaigning on local issues, organizing a local event)?
- 5 = Have done a favour for a neighbour
- 6 = Voted in the last election

110. Would you say that most people in this village could be trusted to work in your interest?

Not at all	Not very much	I neither trust nor distrust	A fair amount	A lot	Don't know
1	2	3	4	5	6

111. Would you say that village leaders could be trusted to work in your interest?

Not at all	Not very much	I neither trust nor distrust	A fair amount	A lot	Don't know
1	2	3	4	5	6

112. Has the accountability of **village leaders/heads** changed since 8 years ago/2006?

By “**accountability/responsibility**” I mean justification of actions or decisions. **CIRCLE**: 1 = Decreased, 2 = Increased, 3 = Haven’s changed

THANK YOU VERY MUCH FOR HAVING PARTICIPATED IN THIS SURVEY!

- Please make sure all the questions are answered. -

Do you have any comments?

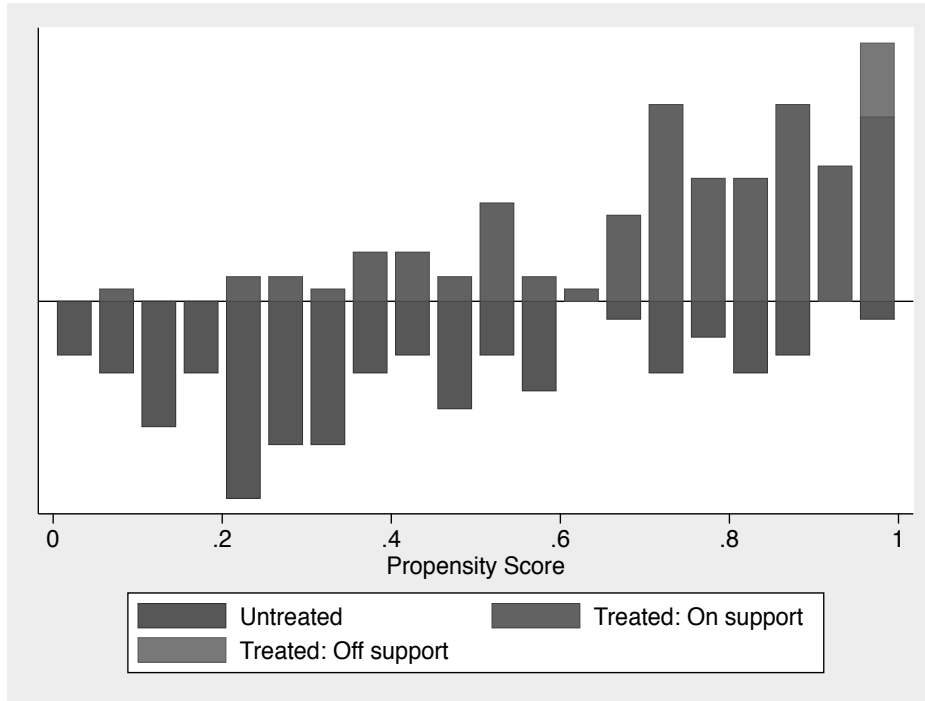
Time interview ENDED: ____:____

Who was else present during the interview?

FOR ENUMERATOR: Please write down all the important notes and observations during the interview

**ANNEX 16: BALANCING DIAGNOSTICS OF MATCHING FOR PROBIT
MODEL AND TESTING H2**

Common support: 6 off support



	Unmatched	Mean		%reduct		t-test	
	Matched	Treated	Control	%bias	bias	t	p>t
nonfor_particip	U	0.10169	0.24691	-38.8		-2.78	0.006
	M	0.10714	0.08036	7.2	81.6	0.69	0.494
HH_headGN	U	0.11017	0.2716	-41.7		-2.99	0.003
	M	0.11607	0.0744	10.8	74.2	1.06	0.29
hh_headEDUY	U	0.4661	0.55556	-17.9		-1.24	0.217
	M	0.47321	0.48214	-1.8	90	-0.13	0.894
genderedu	U	0.01695	0.04938	-18.1		-1.31	0.191
	M	0.01786	0.00595	6.6	63.3	0.82	0.414
pl1000	U	1.2011	0.56898	48.6		3.14	0.002
	M	0.95835	0.78006	13.7	71.8	1.55	0.122

hh_electN	U	0.89831	0.96296	-25.5		-1.7	0.09
	M	0.92857	0.91369	5.9	77	0.41	0.681
livestockY	U	0.66102	0.87654	-52.6		-3.53	0.001
	M	0.66071	0.63393	6.5	87.6	0.42	0.676
tr_wakillN2	U	0.16102	0.5679	-92.8		-6.61	0
	M	0.16964	0.14286	6.1	93.4	0.55	0.583
fordistM1000	U	1.5048	1.0479	68.7		4.5	0
	M	1.484	1.3658	17.8	74.1	1.36	0.174
pw1	U	5.7335	4.9937	22.4		1.53	0.127
	M	5.7472	6.087	-10.3	54.1	-0.79	0.432

Summary of the distribution of the abs (bias)
--

BEFORE MATCHING

Percentiles	Smallest			
1%	17.8733	17.8733		
5%	17.8733	18.08363		
10%	17.97847	22.36292	Obs	10
25%	22.36292	25.53385	Sum of Wgt.	10
50%	40.26144		Mean	42.70631
		Largest	Std. Dev.	24.18353
75%	52.61775	48.589		
90%	80.73988	52.61775	Variance	584.8432
95%	92.77346	68.70631	Skewness	0.8319887
99%	92.77346	92.77346	Kurtosis	2.800109

AFTER MATCHING

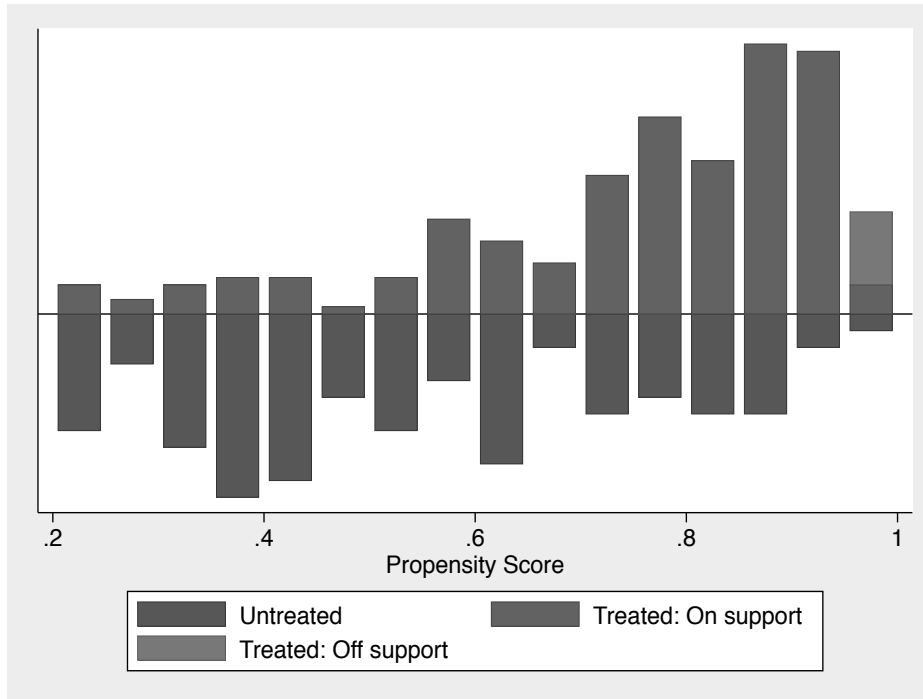
Percentiles	Smallest			
1%	1.783971	1.783971		
5%	1.783971	5.876592		

10%	3.830281	6.107396	Obs	10
25%	6.107396	6.539361	Sum of Wgt.	10
50%	6.895606		Mean	8.661602
		Largest	Std. Dev.	4.568848
75%	10.77304	10.27178		
90%	15.73633	10.77304	Variance	20.87437
95%	17.76836	13.7043	Skewness	0.6290086
99%	17.76836	17.76836	Kurtosis	2.814441

Sample	Pseudo R2	LR chi2	p>chi2	MeanBias	MedBias
Raw	0.319	85.72	0	42.7	40.3
Matched	0.038	11.81	0.298	8.7	6.9

ANNEX 15: BALANCING DIAGNOSTICS OF MATCHING FOR LOGIT MODEL AND TESTING H1

Common support: **10 off support**



	Unmatched	Mean		%reduct		t-test	
	Matched	Treated	Control	%bias	bias	t	p>t
hhsizet	U	5.2952	5.5217	-12.5		-1.02	0.308
	M	5.35	5.02	18.2	-45.7	1.97	0.05
fordistM1000	U	1.3157	1.395	-11.9		-0.91	0.363
	M	1.3384	1.3928	-8.2	31.4	-0.82	0.412
hh_headEDUY	U	0.51905	0.6087	-18.1		-1.44	0.151
	M	0.52	0.58167	-12.4	31.2	-1.24	0.216
age40	U	0.68571	0.73913	-11.8		-0.93	0.352
	M	0.7	0.67	6.6	43.8	0.64	0.52
HH_headGN	U	0.17143	0.1087	18.1		1.4	0.164

	M	0.165	0.205	-11.5	36.2	-1.03	0.304
tr_compN	U	0.44286	0.18478	57.7		4.41	0
	M	0.415	0.385	6.7	88.4	0.61	0.541
pw1	U	5.3988	5.6461	-8.3		-0.64	0.525
	M	5.4573	4.8827	19.2	-132.3	2.09	0.038
satmobtvLand_st	U	0.0634	-0.08787	14.8		1.2	0.233
	M	0.06355	-0.01441	7.6	48.5	0.73	0.467
coredist2	U	2.0667	2.8696	-80.3		-6.28	0
	M	2.11	2.1567	-4.7	94.2	-0.44	0.662

Summary of the distribution of the abs (bias)
--

BEFORE MATCHING

Percentiles	Smallest			
1%	8.267833	8.267833		
5%	8.267833	11.77646		
10%	8.267833	11.9044	Obs	9
25%	11.9044	12.50565	Sum of Wgt.	9
50%	14.77902		Mean	25.93337
		Largest	Std. Dev.	25.25521
75%	18.08436	18.08151		
90%	80.30893	18.08436	Variance	637.8259
95%	80.30893	57.69218	Skewness	1.456139
99%	80.30893	80.30893	Kurtosis	3.453658

AFTER MATCHING

Percentiles	Smallest			
1%	4.667775	4.667775		
5%	4.667775	6.61399		
10%	4.667775	6.706455	Obs	9
25%	6.706455	7.615919	Sum of Wgt.	9

50%	8.168791		Mean	10.57464
		Largest	Std. Dev.	5.214037
75%	12.43782	11.53102		
90%	19.20992	12.43782	Variance	27.18618
95%	19.20992	18.22007	Skewness	0.6848672
99%	19.20992	19.20992	Kurtosis	2.05251

Sample	Pseudo R2	LR chi2	p>chi2	MeanBias	MedBias
Raw	0.183	68.03	0	25.9	14.8
Matched	0.025	13.74	0.132	10.6	8.2