Original Research Article

The research and practice of integrating conservation and development: Self-reflections by researchers on methodologies, objectives and influence

Maya Pasgaard [a,*], Neil Dawson [b], Laura Vang Rasmussen [c], Martin Enghoff [d], Arne Jensen [d]

[a] *Department of Geosciences and Natural Resource Management, Faculty of Science, University of Copenhagen, Oster Voldgade 10, DK-1350 Copenhagen, Denmark*
[b] *School of International Development, University of East Anglia, Norwich, NR4 7TJ, United Kingdom*
[c] *School of Natural Resources & Environment, University of Michigan, 440 Church St., Ann Arbor, MI 48109, United States*
[d] *Nordic Agency for Development and Ecology (NORDECO), Skindergade 23, DK-1159 Copenhagen K, Denmark*

ARTICLE INFO

ABSTRACT

This study examines the application of mixed-method and participatory approaches to conservation and development research. Both approaches were applied in a research project on the relationship between ecosystem governance and the wellbeing of local communities adjacent to a protected area in Laos. By encouraging four of the involved field researchers to reflect upon and expose their practical approaches as scientific experts (in terms of methodologies, objectives, reliability of results and research influence), this article aims to improve our learning from research practice and to promote reflexivity in research. The reflexive study presented here emphasizes the social and political context or real world situation against which research outputs can and should be evaluated, and retrospectively sheds light on the barriers to reach research objectives. In essence, the article addresses the relation between science and policy, and underlines the political undercurrent of conservation and development research in facilitating institutional change. The article outlines the very role of researchers in developing conservation policies, and provides a foundation for institutions and individual researchers to promote critical and constructive self-reflections in scientific practices.

1. Introduction: the politics of conservation and development research practice

Nature conservation and development goals have increasingly merged on the international scene (Miller, 2014) illustrated by the emergence of Payment for Ecosystem Services (PES) and Reduced Emission from Deforestation and Degradation (REDD+) schemes, trickling down to national and sub-national scale projects, and blending with decentralized and participatory management initiatives in Protected Areas (e.g. Balooni and Lund, 2014; Pasgaard and Mertz, 2016; Sills et al., 2014). Academic scholars are trying to keep up with progress through a plethora of research projects and publications, some with an explicit but hotly debated agenda of facilitating institutional change (Castree, 2015a,b; Cornell et al., 2013; Milkoreit et al., 2015; Thiel et al., 2015). This debate puts into question the role of science, scientists and research practices

in conservation and development politics; a complicated question which has been debated and addressed empirically by scholars across fields.

Such debates about science and scientists facilitating institutional change are rooted in a long-standing (cf. Gieryn, 1983; Hoppe, 2005) and ongoing (e.g. Milkoreit et al., 2015; Naeem et al., 2015) struggle about the perceived boundaries between science and policy. Construction of such a boundary is useful for scientists' acquisition of intellectual authority and for the protection of the autonomy of scientific research from political interference, even if this boundary can be claimed not to exist in reality (Gieryn, 1983). Factors which influence the science–policy interface include the extent to which science is integrated into the solutions to public problems, such as forest protection and poverty alleviation, and how, when, by whom as well as *who* will frame those public problems in the first place (Jasanoff, 2005). Thus, there are boundary conflicts over where the role of science ends and that of politics or policy begins, and deeply embedded in these conflicts are the scientific experts, who translate between the different domains (Berling and Bueger, 2015). Such experts are increasingly expected to manage heterogeneous bodies of knowledge and offer balanced opinions in decision-making processes, and with the shift from producing knowledge to providing recommendations, they have become indispensable to the politics of nations, and indeed to transnational and global politics (Jasanoff, 2005), such as conservation and development schemes and projects.

In a recent themed issue, Lund and colleagues empirically explore the politics of expertise and the "professionalization" of participatory forestry (Green and Lund, 2015; Lund, 2015). The authors shed light on science and expertise of participatory forestry *implementers*, namely forestry bureaucrats and social elites of forest adjacent communities, and on the inequity of the professionalization they promote. However, the authors do not address scientific expertise and practices performed by researchers like *themselves*. Still within forest conservation, Tania Li (2007) uncovers the role of different types of development experts or "trustees" who diagnose disorders and prescribe the needed protective interventions, and she also examines the active agency and influence of involved scientists across disciplines. In development research, scholars such as Bierschenk and De Sardan (2014), Goldman (2005), Mitchell (2002), and Mosse (2011) all critically explore the role of "intermediary" actors, so-called brokers or translators of development, or development experts (see also Pasgaard, 2015, on community-based forest protection in Cambodia). The actors under investigation are typically Northern-based NGO workers, government officials or local authorities, some of whom, according to these scholars, exploit their powerful positions and modify projects to serve self-interests. With special focus on participation, Cornwall (2008), Evans et al. (2006) and others critically discuss the meanings and practices of participatory approaches in terms of potential misuse and political aspects, and Cooke and Kothari (2001) even go as far as to condemn the "tyranny of participation", claiming that participatory approaches can lead to injustice and illegitimate exercise of power by advocates of development, who misuse its attractive rhetoric by imposing their own ideological biases on the research methods, results and therefore the institutional outcomes their research contributes to.

1.1. A reflexive gap?

Common for most of these contributions across fields is their dominant focus on the conservation and development *practitioners* (e.g. the NGO aid workers, the agroforestry experts, the local bureaucrats or elites), contrasted by their limited attention to *academic researchers* like themselves, who indeed also influence practice and policies (Martin et al., 2012). This limited attention is indicative of the concern shared by some (mainly political) scholars about the role and implications of scientific expertise in policies; a role, which they claim remains under-researched (Berling, 2011) and occupies a "shadowy place" (Jasanoff, 2005). This concern is particularly evident for environmental science as compared to fields like security studies, where scientific expertise and practice are being studied to a greater extent (e.g. Berling and Bueger, 2015; Kurowska and Tallis, 2013), possibly because of the traditional apolitical and positivistic nature of investigating "the environment" (e.g. Forsyth, 2011; Neumann, 2005). Calls to integrate reflexivity into for instance livelihoods research have been made (Prowse, 2010), suggestions to add self-ethnography in development practice have been aired (Mosse, 2005), and debates challenging conservationists to be explicit about their hard choices have been raised (McShane et al., 2011). However, such practical reflections from conservation and development researchers are largely missing or merely feature as good intentions (Cornell et al., 2013, p. 61) with very little concrete details (however, for an inspiring reflexive dialogue on the role of geographers in the politics of knowledge on global environmental change, see Castree (2015a, b)).

Our study addresses this reflexive gap by exploring how researchers bring the plural perspectives of ecosystem services (ES) and wellbeing studies into conservation and development practice to facilitate institutional change. The aim of this exercise is dual, since we both seek to improve what we can learn from our own research and the (institutional) changes we make, and because we wish to promote reflexivity among other actors; hence, reflexivity is both a mean and end in itself. Empirically, we compare two different approaches to conservation and development research from the researchers' points of view, namely mixed-methods approaches and a participatory approach. These two approaches were applied together and designed to complement one another in a research project in Laos. In other words, this article aims to investigate research practices in conservation and development from the perspective of the researchers themselves, in particular concerning their reflections on the potential impact of their work in the face of contextual barriers.

This paper is organized into five main sections. Following this introduction, the second section outlines the conceptual frame structured around and inspired by notions of boundary work and practical reflexivity.[1] The third section presents the

---

[1] Following Berling and Bueger (forthcoming), we think of practical reflexivity both as a tool for considering biases or limits of research, and as a way of thinking (back) on how science is embedded in practical situations, i.e. post-fieldwork in this case.

research project "Ecosystem Services, Wellbeing and Justice" in Laos and explains how the practical reflexivity of the involved researchers was operationalized for the present study. The fourth section provides a brief summary of the main project findings acquired through the two methodological approaches, and presents the research practices, starting points and barriers exposed through the self-reflectivity of the involved researchers. The fifth and final section revisits the discussion of the politics of conservation and development research and the role of scientific experts, and closes with some suggestions to promote reflexivity in research.

2. Conceptual frame: Practical reflexivity in conservation and development research

From a theoretical and conceptual perspective, we can relate the earlier-mentioned debates about institutional change in conservation and development to the debates of science–policy boundaries and expertise, and add a reflexive gaze. The relation between these debates is evident as some scholars actively wish to "[link] knowledge with action for effective social responses to persistent problems of unsustainability" (Cornell et al., 2013, p. 61), or as other scholars warn their fellow action-oriented researchers, who they believe "can be attacked by political actors for having non-scientific motives, can be exposed to criticism and misrepresented in the media, and as a result lose some of their science-based authority in the process" (Milkoreit et al., 2015, p. 93). Interestingly, the two groups of authors cited here both call for reflections on whether and how they (should) facilitate institutional change; one calling for the science community to accept its responsibility for transformation and engagement while acknowledging the political nature of responding to global change (Cornell et al., 2013), the other pointing out that conducting science can carry individual and social risks of which scholars should at least be aware (Milkoreit et al., 2015). While none of the authors go into many details about their *own* engagements and awareness, they exemplify the spectrum of the debate we aim to address and empirically inform with our practical reflexivity, and eventually advance in our concluding discussion.

As a core dimension of practical reflexivity, we need to think about the ways in which academic practices are related to political practices, and practical reflexivity thereby becomes a valuable tool for scrutinizing how academics organize their relationship with politics and society, as their knowledge intervenes in debates (Berling and Bueger, forthcoming). Indeed, asking questions about expert practices and the production of scientific knowledge is important, including questions about how researchers' sayings and doings play out in concrete situations, which in the end should foster reflexive empirical work on researchers' own practices (Berling, 2011; Berling and Bueger, 2015). In this study, we emphasize self-reflections on research practices, and of the specific contextual factors presenting barriers to institutional change. We approach these issues empirically through exploration of (i) researchers' methodological philosophies and world views; (ii) their objectives and intended audience; (iii) perceived reliability of the outputs they generate and; (iv) the influence of their research.

3. Empirical approach: Research on ecosystem services and wellbeing exposed to practical reflexivity

3.1. The 'Ecosystem Services, Wellbeing and Justice' research project: Objectives and methods

The research project 'Ecosystem Services, Wellbeing and Justice' forms the empirical backdrop for the reflexive study presented in this paper and is therefore briefly introduced below with emphasis on the objectives and methods of the project. However, to derive meaning from an analysis of research practice, it is essential to initially take stock of the real world situation – or social and political context – of the tropical forest governance under study, as illustrated in the following. In the case of Laos, and many other countries, nature conservation as a government led strategy is primarily a top-down exercise. Conservation policies often form part of political strategies; land use planning processes in Laos aim to control land use practices of rural populations, specifically to eradicate shifting cultivation, and there is a general lack of participation in political life (Castella et al., 2014; Lestrelin et al., 2012a,b). Moreover, protected area governance receives very limited funding: the Nam Et-Phou Louey National Protected Area (NPA) exemplified in this study has a budget of about $500k per year with only $8k from the Lao government (Ernst and Young, 2015). In such locations there are considerable social and political barriers hindering the inclusion of multiple perspectives, such as ethnic difference and histories of conflict, even in places where more moderate or progressive government agencies and international organizations operate.

The research project in question set out to combine concepts of justice with those of wellbeing, drawing on conceptual insights derived under earlier related research, which exposed the multiple values and claims of those impacted by conservation and oversight of them through dominant ES approaches (see Sikor, 2013). The stated overall project aim was to improve understanding of how ES can be managed to bring about poverty alleviation, and to develop tools that enable this new knowledge to maximize development impacts. In particular, the project served to provide a foundation for a better targeting of policies allowing poor people to benefit from local ES and realize greater participation in management decisions. A specific sub-objective was to develop and test tools appropriate for remote and poor regions in tropical developing countries to inform wider research on ES and poverty alleviation by demonstrating practical ways to incorporate justice and wellbeing analysis into research designs. A means to reach these ends was to integrate empirical ecological and social research data to produce new knowledge through mixed-methods approaches. Another means to reach the project objectives was to develop and verify a participatory tool for Community Ecosystem Service Assessment and Dialogue (CESAD) in collaboration with the NPA authorities and Wildlife Conservation Society (WCS), the major conservation practitioners in the Nam Et-Phou Louey NPA. The intention was to support testing of tools in other sites in Laos, and apply these tools

to improve the effectiveness of interventions in including and benefitting poor and marginalized individuals and groups. Accordingly, the CESAD tool should provide guidance to development practitioners and environmental managers on how to involve poor people, and how to identify the key stakeholders in support of inclusive ecosystem management that promotes poverty alleviation. Thus, the research project had clear aims to influence policy in terms of benefit distribution and management decisions, and thereby to facilitate institutional change to maximize development impact.[2] Notably, there was an explicit donor and government stakeholder-driven demand for multiple methods and participatory approaches; this demand was met with the development and integration of the CESAD tool. It is also worth mentioning that the project design responded to the particular context, especially the political context and its effects on conservation practice.

In the following, we briefly introduce the methods applied in the two main approaches; mixed methods and the participatory tool (CESAD), respectively. The mixed method approach was applied by several field researchers, of which two are represented here (see Table 2). Researcher A intended to capture ES availability, collection and use with a focus on seasonal variation (see Rasmussen et al., 2016a,b), while researcher B intended to study how ES contributed to participants' wellbeing, how their wellbeing and the contribution of ES to it had changed over time, what had caused those changes and how people felt about the changes which had affected them, particularly ecosystem governance. The participatory tool, of which two field researchers are represented here, used focus group discussions involving different groups of community members, (i.e. low-income, high/middle income and women groups). These focus group discussions are intended to be conducted by NPA staff or NPA support staff trained to facilitate participatory community exercises and they are conducted with the aim of establishing an on going dialogue between communities and NPA authorities. The participatory tool is outlined in a manual, which describes the steps in establishing and conducting the focus group discussions, and how to organize, analyze, interpret and report the data.

3.2. Operationalizing practical reflexivity

With point of departure in the conceptual frame (Section 2) and the empirical backdrop (Section 3.1), this paper relies on a reflexive revisit of research practices and encounters (see Kurowska and Tallis, 2013; see also Tsing, 2004), as experienced by the researchers themselves.

Specifically, the study of their research practice and influence presented in this paper was primarily designed and executed by the first author of the paper, who facilitated and relied on reflections and input from four of the field researchers, who co-author the paper. The first author only became affiliated with the research project in its very final stage to assist with outputs, and was *not* part of the proposal writing, research planning, and data collection in the field. This position uniquely allowed the first author to study the research practices from a distance as an "external insider" (Dahal and Adhikari, 2008), who can mediate and unify, while enjoying the trust and understanding of the field researchers.

Facilitated by the first author, the four field researchers were explicitly asked to revisit their research practices and reflect upon their: methodological philosophies and world views; objectives and intended audience; perceived reliability of the output generated and; influence of the research. The first author took point of departure in a project workshop and written project material (project proposal, published/draft articles, manuals, unpublished notes) in order to pose relevant questions about the two research approaches. Questions were handed to the four field researchers in a written format allowing for time to reflect, and follow-up questions and dialogues were initiated to elaborate on the answers given (see questionnaire templates in Appendix A and B). A second project workshop provided a joint platform to further develop the work in progress. Throughout the reflexive study, draft versions of the manuscript were circulated welcoming comments and revisions from the field researchers.

4. Results of reflections: Research practices, context and barriers

In order to expose the research practices and influence (starting points and barriers), we compare mixed methods and the participatory tool based on researchers' reflections supplemented and informed by the research project material (see Section 3.2).

To establish a common anchor point, however, we first summarize and compare in Table 1 what the different research approaches *generated* in terms of knowledge and impacts concerning ES and wellbeing. Together with Table 2, which summarizes the background and findings from this reflexive study, Table 1 shows that the mixed-method approaches and the participatory approach complement and supplement each other. In particular, the different approaches brought together offer various perspectives and empirical insights concerning land use changes and natural resource use, equity and wellbeing, and local participation. For instance, empirical findings range from matters of complexity in the use and availability of resources and how policies affect these uses (A), to matters of access and equity (B), and local expression of needs (participatory tool). Joined together, the diversity of methods ensures a cumulative contribution of new and detailed knowledge and thereby covers multiple aspects of 'Ecosystem Services, Wellbeing and Justice' as intended (Table 2).

---

[2] The objectives of the research in question show a close connection between (being a) researcher versus conservation practitioner or authority; a boundary which is often blurred and overlapping, which adds a further layer onto the reflexivity we wish to promote in this paper.

Table 1

Summary of main findings across methods applied in the research project.

Source: The involved researchers.

Main results: new knowledge and impact on ES and wellbeing in Protected Areas in Laos			
	Mixed methods, researcher A	Mixed methods, researcher B	Participatory approach, CESAD
Land use challenges	- Government land-use planning policies have limited fallow periods to a maximum of 2 years, whilst at the same time promoting expansion of cash crop production. - The results are rapid land use transitions from shifting cultivation to continuous commercial maize cultivation	- Access to land for agriculture was particularly restricted in core areas of conservation. More powerful villagers seek to and are able to undermine rules through informal negotiation with local government officials. - Conversion of village forests to maize had impacted water regulation, climate, availability of food/wildlife and reduced potential for field rotation/soil conservation. - Mining developments had detrimental impacts on river water quality, affecting availability of important foods, income generating resources and health (children affected when bathing etc.). - Changing aspirations for cash crops and livestock led to increased demand for flat, productive land, including areas within the protected area.	- Limited access to farming land directly related to the NPA establishment and the associated restrictions. - Focus on commercial maize production in unsustainable shifting systems has significant negative impact on other and alternative land uses and incomes. Still, facilitation of better access to agricultural land was clearly the top priority among the CESAD participants.
Equity and wellbeing	*Not investigated*	- Financial resources increased greatly for maize-growing households. - Lives had changed hugely within a generation – resettled from forest to new, more developed lives, water, education, health centres, roads, access to (distant) markets. However access to natural resources for food and income had declined due to land conversion and restrictions with many less able to meet basic needs and secure enough food than ten years previously. - Increasing reliance on social protection and inequality increasing. - Aspirations changing due to multiple influences including development discourse. Most desire to educate children, diversify livelihoods while still farming. - Dissatisfaction with lack of influence in decisions relating to farming, local land allocation, NPA and mining. Inconsistency and lack of transparency in NPA rules seen to be unjust for poorer, less powerful inhabitants.	- Land allocation among villages/villagers highly unequal with strong impact on equity and wellbeing. - Need for stronger authority support in regulating land access.
Natural resource use	- The main harvesting source (in terms of frequency and quantity) for wild plants and animals was agricultural fields. Yet, the primary forest was deemed most important in local people's self-evaluations of collection patterns. - Since the shift to more permanent cultivation had led to heavy use of agricultural inputs, the availability and use of wild foods from agricultural fields had accordingly declined. This was especially so in villages where the transition towards continuous cultivation was most pronounced. - Under the more intensive farming system, wild plants and animals were more likely to be considered weeds and pests than they were beneficial resources.	- Increasing external influence and better infrastructure leading to sporadic explosions in demand for resources such as red mushrooms, white orchids etc. for sale. But access to more locally valued resources decreasing. - Loss of availability of wild meat due to rules and clearance of village forest, honey less available and so on. Still traditional activities persist, especially household items (baskets, sieves, traps, some medicines). - Fishing very important for many. Habitats outside primary forest important for these, inside NPA mostly for marketable NTFPs.	- Forest degradation is widespread with a serious negative impact on benefits from and use of natural resources. - Call for stricter enforcement of forest protection. Utilisation of and benefits from wildlife, forest products, aquatic products have decreased significantly. - Call for better management and management planning of natural resource use including restrictions in the use. - Call for stronger local ownership and user rights to resources. Widespread recognition that there is need for balancing the need for agricultural land with the upholding of ecosystem services.
Local participation	*Not investigated*	- Imposed rules with minimal consultation have become the norm. So much so that people often report these procedures to be fair because they come from authority, which gives them weight and minimises chances of dissatisfaction and insecurity resulting. But especially where outcomes are worse than expected or promises of support not upheld, or more powerful villager can negotiate better outcomes for themselves with local government or officials, people voice a great sense of injustice. - Some actively seek to enact change through meetings and letters, and call for enhanced participation. Decisions often made at village level and village leaders may represent an elite group rather than the poorest.	- CESAD tool showed that locally there is a high level of interest in local participation in management decisions in the areas, and there is a general wish to see better collaboration between communities and authorities on management of the area. - The use of CESAD tool is clearly supportive of local participation.

4.1. Methodological philosophies and world views applied by the researchers

Insights on philosophies and worldviews adopted by the researchers are important to understand their respective backgrounds, choices, approaches and findings, and eventually to make sense of how they perceive their own practice and influence in facilitating institutional change.

Applying mixed methods, researcher A did not perceive herself as belonging to a particular philosophy of science or worldview; rather, she focused on the connection between the purpose of her research and the methods employed, emphasizing the importance of estimating the *actual use* of ES in terms of product type and amount. Researcher B (also applying mixed methods) was more elaborate and attentive to his own positionality as a Western researcher and to his approach, which he described as inductive and interpretive with an emphasis on the perceptions of the participants in his studies. He considers his approach as "primarily constructivist with elements of critical realism", and underlines its potential to advance and extend more normatively rigid methods and indicators. Even more elaborate were the researchers behind the participatory tool, who explicitly situate their method as "action research" based on "the philosophy that research and taking management actions […] need to be tied together", for instance by giving a better voice to local communities. While based on an interpretive worldview, the participatory researchers still point out the need to triangulate results and reduce differences in subjectivity among actors. Thus, these joint reflections reveal different viewpoints across the researchers, and distinguish the mixed methods from the participatory tool by the clear aim of the latter to support institutional change.

Table 2

Summary of objectives, joint contributions, social and political contexts and main barriers perceived by the researchers.

Sources: CESAD manual, project proposal, researchers' reflections, project results (published/notes).

Summary of research objectives, findings, contextual factors and barriers across approaches	Multi-methods approaches		Participatory approach
	A: Semi-structured interviews, collection diaries, plot monitoring and participant observation	B: Household surveys, interviews (semi-structured, life-history, informal, and key informant), focus groups and participant observation	CESAD: Focus group discussions to be facilitated by NPA or NPA support staff
Overall objectives of research project	Produce new knowledge of the relationship between Ecosystem Services and poverty alleviation through investigation of justice and wellbeing Develop and test tools to inform wider ESPA research Generate new datasets on Ecosystem Services and their effects on wellbeing		
Specific sub-objectives	Fill a knowledge gap concerning the linkages between ES availability and actual use	Improve social understanding and knowledge about linkages between (governance of) ES and wellbeing; develop and test methods	Develop and verify a participatory tool Improve local decision-making and dialogue
Diversity and relative levels of contribution (see Table 1)			
-Land use challenges	High	High	Some
-Equity and wellbeing	Not investigated	High	High
-Natural resource use	High	Some	Some
-Local participation	Not investigated	High	High
Starting point for the research	First study of its kind (research and knowledge gaps).	Research and knowledge gaps evident Socio-political context (weak governance, minimal political participation, basic land-use planning, rapid changes).	Participatory research tradition exist The state of Laos forestry sector with regard to little participation and inclusion
Main barriers for achieving objectives	The collection of some products may have peaked outside the sample weeks, which was not captured in the data sets.	Relational barriers (e.g. staff changes) and logistical/practical barriers.	Future application of tool; institutional ownership; competing resource demands

4.2. Objectives and intended audience

With regard to research objective and in line with the above reflections, researcher A emphasizes the actual observable use of ES and the need to create (missing) causal linkages. She stresses that conservation and development actors are the target audience of her research, and she acknowledges that scientific analyses are only part of a larger realm of political and economic influences on decision-making. However, for these scientific analyses to be relevant the "scale of analysis must match the scale of decision-making", she notes, and should be delivered as meaningful recommendations to decision-makers in order to avoid excess complexity. Researcher B focuses on his aim to develop detailed social understanding of participating local communities, and to develop knowledge of the links between ES, their governance, and the human wellbeing, poverty and development components—all through a locally meaningful conceptualization rather than the normative definitions often applied. Reflecting on the research project as a whole, he stresses its contribution to institutional change in terms of improved governance, enhanced representation of local perceptions, and greater dialogue. While the research has multiple audiences for various outcomes, he notes that

> "Unfortunately, policy influence is more common through large n [many data points, ed.] quantitative studies, which are seen as robust and generalizable, even in conservation and development where they can overlook much of the

important complexity and socio-political context [...] Mixed-method studies can receive policy attention, but it helps to provide clear quantitative results, which are supported with qualitative detail."

The participatory researchers were again explicit in their goal to support change, such as transformations in decision making, relationships and dialogue, and to co-create knowledge with local communities that can be used in practice. For instance, their most prominent goal is to improve "the management of the ecosystem based on the local realities and perceptions" with the underlying rationale "to be transformative and initiate 'real world' system change". While leaning strongly towards the local communities as partners and knowledge co-creators rather than participants, these goals of the participatory tool were developed by the researchers based on their experience and dialogue with authorities and local communities in similar situations. In sum, these reflections illustrate the different perceptions among the researchers about the role and purpose of their research from providing policy recommendations to facilitating system change.

4.3. The perceived reliability of the output generated

When asked to reflect upon reliability, researcher A emphasizes data representativeness and triangulation, and considers whether a method is "well-established". In line with the quote by researcher B above, she likewise indicates a strong belief in generalizability of results to make a contribution, while stressing the need for qualitative data. For instance, she considered it important to

"...apply a research design that would allow us to generalize findings beyond the sampled households. If we hadn't done so, our contribution would have been more limited [...] But the quantitative estimates of product extraction derived from our collection diaries don't provide an explanation of local people's collection patterns. In order to know why people collect in the way they do, you'll have to supplement the quantitative estimates with e.g. interviews."

Researcher B is less focused on representativeness as opposed to details about the village context, and again praises mixed methods as valid and reliable, unless they function as separate studies only to be joined after analysis. The researchers behind the participatory tool acknowledge that a possible bias in the process of identifying and engaging participants is difficult to avoid in practice, as is the risk of bias when using local facilitators associated with the local authorities. While validity and ability to generalize are perceived as important, this is weighed against what "one can expect to get in application of practical tools". Taken together and connected with the previous paragraphs, these reflections show a strong sense of context among the four field researchers despite their inherent differences, as they all seem to consider and balance the realities of both their input and the receiving ends of their research.

4.4. Influence of the research: social and political contexts and barriers

Lastly, with regard to research impact, researcher A believes that the application of robust methods yielded information on key issues as intended, thereby fulfilling the research objectives, even if the output has only reached researchers through academic publications so far. In terms of the social and political context and barriers of the research, she acknowledges that the study was the first of its kind to address the mismatch between ES availability and use. Reflecting beyond the practical/logistical pre-conditions and the initial research basis, researcher B adds the complications experienced by "unexpected obstacles", such as staff turnover at the conservation agency in Laos, and difficulties in securing local research assistants. Besides, he reflects upon the rapid changes that rural areas are undergoing through global economic influence and the associated biological, social and cultural changes, which provides a fascinating context requiring a concerted study. Specifically, he considers how the

"top down nature of governance in Laos and the rudimentary nature of land use planning procedures meant that provision of additional social insights and instigation of possible forums for dialogue between authorities and local communities could have considerable impact".

This resonates with the reflections by the two participatory researchers, who mention the current state of Laos forestry sector with regard to participation and inclusion as a main social and political context, but also a barrier. While the participatory tool is very practical and has been relatively successful in reaching the objective of giving value and voice to local communities in order to impact ecosystem management in the area, "[s]uccess must also be measured in how the tool is being used in the future". This success is dependent on overcoming barriers of existing institutional ownership and competing demands for resources. Once again, these joint reflections reveal an attention to the context and realities affecting the practices, outcomes and influence of the respective research approaches. Table 2 summarizes the objectives, joint contributions, contextual factors and barriers perceived by the field researchers.

4.5. An afterthought about important moments of and opportunities for policy impact

Besides the actual influence of the research reflected upon above, it is interesting to draw attention to the pre-conditions, aftermath, and particular circumstances that enable this influence. Researcher B notes that collaborations were set up at the very early stage of the project, and that these were "paramount to our ongoing efforts to have an impact (even after the funds have run out)". Similarly, other important moments were the closing project meeting (which further glued the individual contributions together and gave rise to a policy brief presented and distributed in Laos), and the afterlife of the participatory tool, which is to be adapted for an upcoming World Bank project providing training to Lao protected area staff nationwide. We speculate whether these moments of influence are as – or even more – important than the details of the research approaches, when it comes to facilitating institutional change.

4.6. Meta-reflections by the authors

As lead author of the paper, who developed the design and framing of this reflexive study, I find it mandatory to practice what I preach and try my own self-reflexive medicine. I therefore briefly expose my own world view, objectives, and perceptions of reliability and impact in the following to conclude our results section. In particular, I am strongly influenced by my academic viewpoint rooted in Political Ecology and by my recent interest in scientific expertise. The paper did however take a slight turn to move beyond a focus on the experts or their boundary positions to also include the actual process and content of the research project in Laos. At the inception and outset of the study, I expected some resistance and skepticism from the involved researchers due to my pre-assumptions about a reflexive gap, but I was taken aback by their enthusiasm and interest in my idea and approach. For this paper, I was looking for reliable and valid findings in the sense of presenting honest and transparent reflections of research practice, setting an example for other researchers, while providing useful insights on the (political) context and barriers for conservation and development projects. Time will tell if this study will have the intended impact and facilitate institutional change among scholars towards integration of practical reflexivity in their research.

Lastly, the four field researchers who shared their reflections in this paper, all find it pertinent to place even more emphasis on the challenge of how we go about creating salient, credible and legitimate information simultaneously for multiple audiences. For example, too little attention devoted to salience may yield results in which the intended audience has limited interest and too little focus on credibility might cause practitioners to question the very findings. Also, as reflections indicate, analysis and publication of academic outputs takes far too long to have the type of local or regional impact we hope for through the research. Therefore it was important to foster and maintain good relationships with people and organization at the local and national scale throughout the project and to communicate preliminary thoughts and findings to them. This was done through a series of village (involving villagers) and protected area (involving managers) scale workshops and additionally through a meeting instigated through the project to which all conservation and development stakeholder organizations were invited to discuss the current state of knowledge and trends and their implications for conservation and development research and practice. The project policy brief and CESAD manual were presented at that meeting. They were produced in a timely fashion and in a concise dual-language format specifically to enable influence at that scale. The research findings, relating to trends in local wellbeing, perceptions of justice/injustice and implications for conservation, have clearly been of interest to WCS and government staff at the NPA and national level. The findings alone have not initiated changes in governance but have contributed to momentum within WCS, the World Bank who fund the NPA management, and state NPA officials to make conservation more effective through making it more inclusive and to be perceived locally as being fairer, more participatory and more responsive to their changing needs and circumstances. Subsequent to the project, legal changes governing protected areas have resulted in a need to redefine protected area/village land boundaries nationwide, and our engagement methodologies appear to have been considered useful for approaching this considerable task in the near future. Communication with stakeholders in Laos has also continued after funding period was complete. Researcher B was also asked to tender for consultancy to advise on mitigation plans for the social impacts of road construction through the NPA. This involved addressing historic issues of inhabitation in the core zone of the NPA, involving highly marginalized groups, for which the researcher reported to NPA managers using an environmental justice lens and which has been well-received. There is further scope and preliminary plans for capacity building work at the NPA in future. Regarding wider research, the findings have been taken forward by project members in studies to operationalize equity for conservation purposes, in East Africa and beyond, alongside organizations such as IUCN and the Forest People's Program, in response to Aichi Target 11 of the Convention on Biolological Diversity (CBD) and that work has been publicized at the World Conservation Congress.

5. Further discussions and meta-reflections: towards institutional change

5.1. Science as facilitating institutional change: lessons and increasing demands

This reflexive study illustrates the blurred boundaries between science and policy, and shows an interface where research practices have the potential to facilitate institutional change (see Section 4.6). We do not see this as problematic and threatening (as do Milkoreit et al., 2015 and Naeem et al., 2015), rather as unavoidable (Gieryn, 1983) or even purposeful and desirable (Cornell et al., 2013; Thiel et al., 2015). With this study we add a new reflexive dimension to the current debate, as we show how the practical reflexivity of researchers not only brings additional credibility as they expose their approaches in detail, but also advances our contextual understandings. For instance, afterthoughts about social and political contexts and barriers call into question how the research project managed to bridge the divide between national politics and local perspectives on conservation and development practice as intended. It shows that management of natural resources is so much more than science, and that the social context within which decisions are made, is crucial (Ntshotsho et al., 2015). A non-reflexive account of the research results could bring about misleading conclusions from a developed world perspective in terms of inequity and power biases, while the reflexive account reveals that the research actually captures and facilitates important (but slow and step-wise) progress towards intended transformation in the local historical context (e.g. limited experience with participatory tools). Also, similarly to the findings of Reed et al. (2014), the reflections reveal factors which foster planned and more incidental moments of influence such as future uptake of research methods and policy

recommendations, including: pre-established networks and relationships; planning for knowledge exchange; the timely dissemination of results to key stakeholders, and; exposure of previously undisclosed perspectives of a stakeholder group. These moments or conditions are of increasing relevance to the practicing researchers, since donors of research grants have become more and more demanding in terms of such "evidence of (societal) impact", as are those who assess the quality of higher education establishments. Thus, on the employer side, where the donors and research institutions stand, the request for institutional change is evident, preferably in a form that is measurable and can be documented, and is based on predefined performance criteria or inclusion of certain (participatory) methods. Reflexivity gains further value to researchers because this demand could pose normative dilemmas if researchers do not agree with the criteria, or challenges their notions of objectivity and political neutrality (Gieryn, 1983), though such tensions were not perceived in this project as the funders did not impose a strong normative position. We believe that reflexivity should no longer be seen only as a device for maintaining objectivity or for situating academic knowledge in discursive knowledge and power structures; rather, it should be seen as a practical tool within academia, which becomes useful for navigating in concrete everyday situations (Berling and Bueger, forthcoming). In order to embrace such a reflexive turn, we suggest several concrete changes. At the institutional level, be it in a research institution or at an NGO, organizational structures should be (re-)designed or adapted to better promote and integrate practical reflections, e.g. through specific targets or rewards given through the internal evaluation systems. This could facilitate learning from both project successes and from failures (see Saito-Jensen and Pasgaard, 2014), and thereby increase the chance of intended project impact. Likewise, donor institutions supporting conservation research and practice could have explicit requests for post-research reflections, alongside demands for certain methods and dissemination of results, in order to foster constructive learning. Also, academic journals should follow these examples, like the present journal and its selected reviewers, and be open and willing to publish reflexive papers alongside the more traditional empirical work and treat it as equally valid. In synergy, such initiatives could encourage more researchers and practitioners to reflect more and to share those reflections to the benefit of all.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at http://dx.doi.org/10.1016/j.gecco.2016.11.006.

References

Balooni, K., Lund, J.F., 2014. Forest rights: The hard currency of REDD. Conserv. Lett. 7 (3), 278–284. http://dx.doi.org/10.1111/conl.12067.

Berling, T.V., 2011. Science and securitization: Objectivation, the authority of the speaker and mobilization of scientific facts. Secur. Dialogue 42 (4–5), 385–397. http://dx.doi.org/10.1177/0967010611418714.

Berling, T.V., Bueger, C. Towards Practical Reflexivity: Strategies for handling dilemmas at the boundary between theory and policy. *Geoforum*, forthcoming, themed issue on Science and Security Expertise: Authority, Subjectivity, Knowledge. Rychnovská, D., Pasgaard, M., Berling, T. V. (Eds.).

Berling, T.V., Bueger, C., 2015. Security Expertise: Practice, Power, Responsibility. Routledge.

Bierschenk, T., De Sardan, J.-P.O., 2014. States at Work. Dynamics of African Bureaucracies. Brill.

Castella, J.C., Bourgoin, J., Lestrelin, G., Bouahom, B., 2014. A model of the science-practice-policy interface in participatory land-use planning: lessons from Laos. Landscape Ecol. 29 (6), 1095–1107. http://dx.doi.org/10.1007/s10980-014-0043-x.

Castree, N., 2015a. Changing the Anthropo(s)cene: Geographers, global environmental change and the politics of knowledge. Dialogues Hum. Geogr. 5 (3), 301–316. http://dx.doi.org/10.1177/2043820615613216.

Castree, N., 2015b. Coproducing global change research and geography: The means and ends of engagement. Dialogues Hum. Geogr. 5 (3), 343–348. http://dx.doi.org/10.1177/2043820615613265.

Cooke, B., Kothari, U., 2001. Participation. The New Tyranny? Zed Books, London.

Cornell, S., Berkhout, F., Tuinstra, W., Tàbara, J.D., Jäger, J., Chabay, I., van Kerkhoff, L., 2013. Opening up knowledge systems for better responses to global environmental change. Environ. Sci. Policy 28, 60–70. http://dx.doi.org/10.1016/j.envsci.2012.11.008.

Cornwall, A., 2008. Unpacking 'Participation': models, meanings and practices. Community Dev. J. 43 (3), 269–283. http://dx.doi.org/10.1093/cdj/bsn010.

Dahal, G.R., Adhikari, B., 2008. Bridging, linking, and bonding social capital in collective action: The case of Kalahan Forest Reserve in the Philippines. In: CAPRi Working Paper No. 79, International Food Policy Research Institute, Washington, DC.

Ernst, Young, 2015, Nam Et-Phou Louey National Protected Area Management and Tiger Conservation Project. Statement of receipts and disbursements. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/08/27/090224b08309e107/1_0/Rendered/PDF/Lao0Peopl e0s0D00ended0June030002014.pdf.

Evans, K., de Jong, W., Cronkleton, P., Sheil, D., Lynam, T., Kusumanto, T., Colfer, P., 2006. Guide to Participatory Tools for Forest Communities. Center for International Forestry Research, CIFOR, Bogor, Indonesia.

Forsyth, T., 2011. Politicizing environmental explanations. What can Political Ecology learn from Sociology and Philosophy of Science? In: Goldman, M.J., Nasady, P., Turner, M.D. (Eds.), Knowing Nature. Conversations at the Intresection of Political Ecology and Science Studies, The University of Chicago Press.

Gieryn, T.F., 1983. Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists. Amer. Sociol. Rev. 48 (6), 781–795.

Goldman, M., 2005. Imperial Nature. The World Bank and Struggles for Social Justice in the Age of Globalization. Yale University Press.

Green, K.E., Lund, J.F., 2015. The politics of expertise in participatory forestry: a case from Tanzania. For. Policy Econ. 60, 27–34. http://dx.doi.org/10.1016/j.forpol.2014.11.012.

Hoppe, R., 2005. Rethinking the science-policy nexus: from knowledge utilization and science technology studies to types of boundary arrangements. Poiesis and Praxis 3 (3), 199–215. http://dx.doi.org/10.1007/s10202-005-0074-0.

Jasanoff, S., 2005. Judgment under siege: the three-body problem of expert legitimacy. In: Maasen, S., Weingart, P. (Eds.), In: Democratization of Expertise? Exploring Novel Forms of Scientific Advice in Political Decision-Making, vol. 24, Springer, Dortrecht, pp. 209–224.

Kurowska, X., Tallis, B.C., 2013. Chiasmatic crossings: A reflexive revisit of a research encounter in European security. Secur. Dialogue 44 (1), 73–89. http://dx.doi.org/10.1177/0967010612470295.

Lestrelin, G., Castella, J.C., Bourgoin, J., 2012a. Territorialising sustainable development: The politics of land-use planning in Laos. J. Contemp. Asia 42 (4), 581–602. http://dx.doi.org/10.1080/00472336.2012.706745.

Lestrelin, G., Vigiak, O., Pelletreau, A., Keohavong, B., Valentin, C., 2012b. Challenging established narratives on soil erosion and shifting cultivation in Laos. Nat. Resour. Forum 36 (2), 63–75. http://dx.doi.org/10.1111/j.1477-8947.2011.01438.x.

Li, T.M., 2007. Practices of assemblage and community forest management. Econ. Soc. 36 (2), 263–293. http://dx.doi.org/10.1080/03085140701254308.

Lund, J.F., 2015. Paradoxes of participation: The logic of professionalization in participatory forestry. For. Policy Econ. 60. http://dx.doi.org/10.1016/j.forpol.2015.07.009.

Martin, T., Burgman, M.A., Fidler, F., Kuhnert, P.M., Low-Choy, S., Mcbride, M., Mengersen, K., 2012. Eliciting expert knowledge in conservation science. Conserv. Biol. 26 (1), 29–38.

McShane, T.O., Hirsch, P.D., Trung, T.C., Songorwa, A.N., Kinzig, A., Monteferri, B., O'connor, S., 2011. Hard choices: Making trade-offs between biodiversity conservation and human wellbeing. Biol. Cons. 144 (3), 966–972. http://dx.doi.org/10.1016/j.biocon.2010.04.038.

Milkoreit, M., Moore, M.-L., Schoon, M., Meek, C.L., 2015. Resilience scientists as change-makers—Growing the middle ground between science and advocacy? Environ. Sci. Policy 53 (Part B), 87–95. http://dx.doi.org/10.1016/j.envsci.2014.08.003.

Miller, D.C., 2014. Explaining global patterns of international aid for linked biodiversity conservation and development. World Dev. 59, 341–359.

Mitchell, T., 2002. Rule of Experts: Egypt, Techno-Politics, Modernity. University of California Press.

Mosse, D., 2005. Cultivating Development: An Ethnography of Aid Policy and Practice. Pluto Press, London and Ann Arbor.

Mosse, D., 2011. Adventures in Aidland: The Anthropology of Professionals in International Development. Berghahn Books.

Naeem, S., Ingram, J.C., Varga, A., Agardy, T., Barten, P., Bennett, G., Wunder, S., 2015. Get the science right when paying for nature's services. Science 347 (6227), 1206–1207. http://dx.doi.org/10.1126/science.aaa1403.

Neumann, R., 2005. Making Political Ecology. Hodder, London.

Ntshotsho, P., Prozesky, H.E., Esler, K.J., Reyers, B., 2015. What drives the use of scientific evidence in decision making? The case of the South African Working for Water program. Biol. Cons. 184, 136–144. http://dx.doi.org/10.1016/j.biocon.2015.01.021.

Pasgaard, M., 2015. Lost in translation? How project actors shape REDD plus policy and outcomes in Cambodia. Asia Pac. Viewp. 56 (1), 111–127. http://dx.doi.org/10.1111/apv.12082.

Pasgaard, M., Mertz, O., 2016. Desirable qualities of REDD+ projects not considered in decisions of project locations. Environ. Res. Lett. 11. http://dx.doi.org/10.1088/1748-9326/11/11/114014.

Prowse, M., 2010. Integrating reflexivity into livelihoods research. Prog. Dev. Stud. 10 (3), 211–231. http://dx.doi.org/10.1177/146499340901000302.

Rasmussen, L.V., Christensen, A.E., Danielsen, F., Dawson, N., Martin, A., Mertz, O., Sikor, T., Thongmanivong, S., Xaydongvanh, P., 2016a. From food to pest: Conversion factors determine switches between ecosystem services and disservices. Ambio 1–11. http://dx.doi.org/10.1007/s13280-016-0813-6.

Rasmussen, L.V., Mertz, O., Christensen, A.E., Danielsen, F., Dawson, N., Xaydongvanh, P., 2016b. A combination of methods needed to assess the actual use of provisioning ecosystem services. Ecosys. Serv. 17, 75–86. http://dx.doi.org/10.1016/j.ecoser.2015.11.005.

Reed, M.S., Stringer, L.C., Fazey, I., Evely, A.C., Kruijsen, J.H.J., 2014. Five principles for the practice of knowledge exchange in environmental management. J. Environ. Manag. 146, . http://dx.doi.org/10.1016/j.jenvman.2014.07.021.

Saito-Jensen, M., Pasgaard, M., 2014. Blocked learning in development aid? Reporting success rather than failure in Andhra Pradesh, India. Knowl. Manag. Dev. J. 10 (3), 4–20.

Sikor, T., 2013. The Justices and Injustices of Ecosystem Services. Routledge.

Sills, E.O., Atmadja, S.S., de Sassi, C., Duchelle, A.E., Kweka, D.L., Resosudarmo, I.A.P., Sunderlin, W.D., 2014. REDD+ on the Ground: A Case Book of Subnational Initiatives Across the Globe. Center for International Forestry Research, CIFOR, Bogor, Indoneasia.

Thiel, A., Mukhtarov, F., Zikos, D., 2015. Crafting or designing? Science and politics for purposeful institutional change in Social–Ecological Systems. Environ. Sci. Policy 53 (Part B), 81–86. http://dx.doi.org/10.1016/j.envsci.2015.07.018.

Tsing, A.L., 2004. Friction: An Ethnography of Global Connection. Princeton University Press.

Maya Pasgaard is an Associate Professor at the Department of Geosciences and Natural Resource Management, Faculty of Science, University of Copenhagen. Her research includes socio-political dimensions of tropical deforestation and forest protection, and she studies relations between science, expertise and environmental governance. Address: Oster Voldgade 10, DK-1350 Copenhagen, Denmark.

Neil Dawson is a Senior Research Associate in the School of International Development, University of East Anglia. He specializes in wellbeing, poverty and environmental justice research among rural populations in developing countries in order to contribute to development and natural resource governance. Address: School of International Development, University of East Anglia, Norwich, NR4 7TJ.

Laura Vang Rasmussen is a postdoctoral research fellow at the School of Natural Resources & Environment, University of Michigan. Her research interests lie at the interface of human and environmental systems—mainly on issues related to land use changes, their causes and effects on ecosystems and rural livelihoods. Address: School of Natural Resources & Environment, University of Michigan, 440 Church St., Ann Arbor, MI 48109.

Martin Enghoff is a Senior Consultant and Director of the Nordic Agency for Development and Ecology (NORDECO) working with rural development, natural Resources, humanitarian action and governance. His research interests include programmes and projects for improving livelihoods and sustainable

development in Africa, Asia, Europe and the Arctic. Address: Nordic Agency for Development and Ecology (NORDECO), Skindergade 23, DK-1159 Copenhagen K, Denmark.

Arne Jensen is Senior Consultant of the Nordic Agency for Development and Ecology (NORDECO). He research interests include rural development, natural resources management and monitoring, and disaster risk reduction. Address: Nordic Agency for Development and Ecology (NORDECO), Skindergade 23, DK-1159 Copenhagen K, Denmark.