6. Conclusion
Explorations and lessons for shared research

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6.1. Explorations

This book is about researching and interpreting African environments by reading the landscape and the use of natural resources through different scientific, societal and political lenses. Inevitably, this creates struggles between disciplinary research traditions and emphases, and between the interpretations of the researchers and those of the researched. None of the authors in this book shied away from these struggles. They made productive use of natural science data, treating this information as being of equal importance to the practices and rationales of natural resource users.

In our opening chapter we described a broad spectrum of research in African environments, and demonstrated this breadth by reference to leading scholars who combined generalist and specialist knowledge about human-environment relationships. Our explorations went far back in time - something that in the business of science in the twenty-first century is rarely possible. They referred to the paradigmatic work of Fairhead and Leach (1996) and Berkes (1999) on African environments, institutions and the role of conservation and natural resource management for humanity and nature in the late twentieth century, and they went back even further in time to the nineteenth century, reflecting on Alexander von Humboldt's approaches to researching America's environments (see Wulf 2016). These explorations emphasized the merits not only of a mixed methodology but of the turn towards integration in research on (African) environments (see Bornemann et al. 2017), combining disciplinary methodologies as well as the essentials for knowledge production based on the relationships between researchers and researched.

Now, in our final chapter, we bring into focus multidisciplinary and mixed methods research and their methodological and learning implications. The

articles collected in this edited volume speak of socially and environmentally grounded research that requires ample time and familiarity with specific contexts at various levels, enabling learning as a multidimensional and multilevel process. They reveal key turning points in the participatory research process that arise from collaboration, exchange and intense debates about the role of language and translation in interdisciplinary and intercultural research settings. All the articles have a distinctive approach to the researcher-researched nexus, and are aware of the emergent character of such interactions.

For our final explorations regarding research processes, we again go back in time. We have found it useful to analyse how the contributions of Prudat et al., Oyama, Jewitt et al. and Slezak et al. mirror the basic principles of action anthropology, which was initiated as early as the 1950s (Tax 1975). Sol Tax's initiative in the 1950s was grounded on the understanding that working with the first nation indigenous peoples of the Meskwaki (also called Fox Indians) in their remaining small reserves only made sense if this work was co-research on topics relevant to these people. Moreover, the insights into these topics would be linked to actions in which the anthropologists became advocates for these people in domains in which the local groups did not have the knowledge or power to act. Tax labelled this process action anthropology (see Tax 1975), and his approach was later used by a few anthropologists in the 1980s and 1990s (see Schlesier 1980, Seithel 2000, 2004), but regained momentum in a special issue by Stapp et al. (2012). Foley (1999) and Bennett (1996) then published several critical reflections on how this, often unrecognized, approach had influenced the more widely accepted applied anthropology approach, in which local involvement in research, especially on development issues, was created. In contrast to the action anthropology approach of cocreation and concerted action, applied anthropology is usually implemented as an anthropology *for* but not necessary *with* local people. Applied anthropology tries, to solve practical problems in many other fields as defined only by local people, such as health and medicine, business, education, environmental issues, community development, disaster research and international development (Van Willigen 2002). Applied anthropology, however, tends to lack the critical means to integrate, appreciate or anticipate local knowledge, in contrast to action anthropology, whose creators put at centre stage the local people *and* the researchers.

In the four articles collected in this book, elements of action and applied anthropology can be detected, whether or not the researchers are trained anthropologists. All the researchers demonstrated an openness towards

different disciplines and scientific domains, and exposed themselves to situations of uncertainty in researcher-researched relationships. In all cases, living through discomfort (such as translation challenges and conceptual discrepancies), unexpected and counterintuitive actions led them to come up with accounts that speak about social learning and the co-creation of knowledge, enabling a critical reflection on how research in African environments can evolve. In this way they combined different disciplinary research traditions with a more rigorous and extended approach, taking into account local perceptions about issues and then readjusting to take their next steps.

In the following we look at four elements that seem particularly striking for a reflection about what we would like to call "shared research", by which we mean research co-produced for making use of the fluidity of knowledge about natural and social processes in African environments, in order to demonstrate that there are multiple ways of dealing with the challenges of unsustainable development. These four elements are:

- Learning as a multidimensional and multilevel process over an extended time and scale;
- The dimensions of participatory research;
- The role of language and translation in interdisciplinary and intercultural research settings; and
- Turning points in collaborative research processes.

We also argue that these processes represent journeys that are closer to action anthropology than to applied anthropology, and that this position is needed in order to understand local issues and to engage in a process of shared and also co-owned research.

6.2.   Learning as a multidimensional and multilevel process

The literature distinguishes between different orders of learning. According to Sterling (2011), first order learning refers to the reproduction of knowledge and "doing things better", and second order learning to critical reflection and "doing better things". In addition to these two orders, a transformative form of learning exists, leading to an experience of reflecting about our worldview rather than seeing with our worldview. Such a reflection enables us to be more open to, and to draw upon, other views and possibilities (Sterling 2011).

According to Land et al. (2014), transformative learning implies a paradigm change triggered by experiences of liminality. This paradigm change is an in-between state of ambiguity or disorientation in the process of learning and understanding, and has effects on knowledge production processes. We would also argue that a shared learning process, in which all partners in the process are mutually perceived as providing knowledge, creates the dignity and respect that are the basis for learning collaborations. Like the Fox project in which Sol Tax and his students became engaged with the local first nation people (Foley 1999) and, in another context, research on common pool resource management in African contexts (Haller 2010), the initial top-down approach in each of the processes portrayed gave way to a sharing of knowledge with local actors, and co-developing and enabling actions.

All four contributions in this edited volume are framed by reference points given by global or regional policy frameworks, such as international soil categorization and the implications of soil resource management, policies for afforestation and combatting desertification in the Sahel, efficient energy use by promoting the use of cookstoves, or the multiple use of water reserves for both fish and energy production to enhance food security. The researchers engage in one way or another with understanding institutional design and the governance of common-pool resources in a global-local world (see also Haller et al. 2019). They all contextualize the policy frameworks in which the research is embedded, using thick descriptions of how those frameworks play out in their research processes and in various contexts and localities - and they reveal how much those frameworks differ from the assumptions and conceptualizations of the African environments. All four contributions reflect on their stages of ambiguity or disorientation, Prudat et al. by juxtaposing local knowledge and international soil classifications, Oyama by liminal experiments using urban waste for improving soil fertility and land management, Jewitt et al. by debating cookstoves in culturally and economically diverse settings, and Slezak et al. by addressing the limits of inter- and transdisciplinary research when mind-sets and values are unintentionally reiterated in research collaborations.

Oyama demonstrates, in his account based on extended and experimental field research in Niger, what it means to learn and unlearn in situations of increasing environmental, socio-economic and political stress. He is able to do this because for more than 15 years he returned to his research sites; he is a learner, as well as an advocate for co-creating, with local authorities and leaders, solutions to truly wicked problems that go far beyond his initial fo-

cus on the material basis of soil and land resources in the Sahel. His account shows that the learning at the local level emerges in a completely different way from what was intended by the Greening Sahel policy, and that policies that do not address the systemic complex of the environmental, social and political dimensions of the problem can reinforce or spur on new conflicts. This approach of co-research and learning also speaks about managing common pool-resources in a new and participatory way, and includes elements of action anthropology and constitutionality. It is about trying to understand local solutions and then involving local actors in the common research agenda; this then leads to collectively defined actions, in which the local actors can also see themselves as owners of the process. As Oyama provided a neutral platform for interaction, this constellation was also enabled in a way that resonates well with the constitutionality approach (see Haller et al. 2016, 2018).

The learning process in the article by Jewitt et al. is characterized by multi-stakeholder perspectives on specific events used for experimenting with the clean cookstove technology developed for the global south in the United Kingdom (UK). Their account challenges the promotion of cookstoves and their potential as cost-effective clean-fuel solutions, as propagated by global policy drivers. The researchers' experiences in the UK helped them to design a methodology for fieldwork and to compare experiments in different localities with a view to upscaling them to enhance policy frameworks. They applied, in their learning and knowledge production process, a fluid and varied use of technology, taking into account socio-economic contexts and real-life situations in which the cleaner cookstoves were just an option but not the only solution to the problem of fuel and energy shortages. Knowledge about materiality and practicability was gathered in a way that took local views and knowledge seriously and that also created notions of co-ownership for this process.

By doing participatory and interdisciplinary research with joint data collection, Slezak et al. created learning environments that included social and cultural aspects as well as institutional and legal frameworks. They show how water and fisheries management in water storage facilities in Burkina Faso provided the basis for a more participatory research project called SUS-FISH (Sustainable Management of Water and Fish Resources). The basis of this project was an interdisciplinary approach, which recognized the failure of previous projects that were predominantly based on technical expertise. With their transdisciplinary approach, they gathered social, economic and political information to create pathways for more sustainable fisheries in

Burkina Faso. The very set-up of their project provided uncountable multi-dimensional and multilevel learning processes. These are explored in more detail in the following sections.

The specific collection of these four contributions leads us to conclude that the dimensions of learning are expanded if there is room for critical reflection on research processes and multiple expectations. By formulating (in writing or speech) deeper insights and discomforts, changes of perspective on the research process can shift paradigms and epistemological traditions.

6.3.   Dimensions of participatory research

Being aware of different orders of learning can also contribute to an enhanced understanding of the dimensions of participatory research in African environments. Key elements of participatory research are sequential reflection and action. Participatory research is carried out with and by local people rather than on them. The key difference between participatory and conventional methodologies lies in the location of power in the research process (see Cornwall and Jewkes 1995), which speaks to key elements of action anthropology and constitutionality.

The four contributions in this book all have different approaches to participatory research. Two of them were initiated by research consortia at Swiss and German (Prudat et al.) and Japanese (Oyama) universities. Both of these groups chose the approach of spending longer time on fieldwork in, respectively, Namibia and Niger, during which they collaborated closely with local people as well as with interpreters. For Prudat, who was trained as a natural scientist, the collaboration with his local research assistant was key to any form of data collection and understanding of local people as well as socio-economic circumstances. Oyama, who was trained as environmental scientist, eventually chose the classical anthropological approach of participatory observation, which enabled him to establish relationships with local authorities and leaders and to obtain access to local communities and their livelihoods, as well as their increasing limitations.

The two other contributions were initiated by mixed consortia composed of UK- and Austrian-based researchers as well as researchers from Burkina Faso, Nigeria, Kenya and Malawi. They used their contextual and embodied knowledge to make use of the transdisciplinary research methodology they developed. Both groups debated their methodology in mixed teams of rese-

archers and informants of different backgrounds, sometimes in places that were far away from the actual application of the cookstove technologies or the fisheries management scheme. The combination of the local knowledge of researchers from the research context (Benu state) and the involvement of researchers with links to the administration in Burkinabè fisheries provided a setting for structuring the research process using the shared capacities of local as well as distant knowledge.

The four contributions lead us to conclude, in our reflection on "shared research", that carrying out participatory and integrative research in African environments means being explicit about the roles of those who move in and out of the local context and those who stay. Extended stays in local contexts and the sharing of daily life experiences help to develop a sense of diverse power relations in research teams as well as in researcher-researched relationships. Also, perseverance during challenging workshops and exchanges supports the sequential reflection and action that are typical participatory research dimensions. Key elements for more inclusive learning and better research ethics are mutual respect and trust between unequal research partners and those who are researched. Such research processes require careful planning and an openness towards emerging participation while the research progresses. That also means to accept limitations and to cope with frustration as participatory moments can become overly complex.

6.4.   Role of language and translation in interdisciplinary and intercultural research settings

Multidimensional learning and participatory research inevitably touch on different understandings and epistemologies, and their various expressions in language and speech. In the participatory research set-ups described in the contributions in this edited volume, it was inevitable that language and translation had to be addressed and worked through. These can again represent a sort of liminal experience (see Land et al. 2014), as they challenge worldviews and multiply the possibilities of interpretation. The translation can also act as a way to manage the states of ambiguity or disorientation in the processes of data collection, analysis and interpretation.

There was a moment of discomfort for Prudat et al. when it became clear that the explicit language used in international soil classification neither did justice to nor made sense in the context of nuanced and embodied (through

manual labour) knowledge of soils and their fertility. Prudat and his research assistant created a way to reduce the complexity by developing a sort of code in the translation process. They also deliberately did not deal with the data that could not be fully deciphered and thus could not be linked to their research questions. They opted for data and interpretations that built bridges between local knowledge, which was relevant for livelihoods and agricultural production, and the international soil classification. In this way they could link and contextualize the local knowledge with policy measures and natural resource management regulations. The discomfort of potentially losing out on novelty and understanding because of decisions related to language and interpretation is impressively described in their account.

The translation between engineers and social scientists as well as between researchers and cookstove users locally and in the UK was a key element of Jewitt et al.'s experimental set-up. They designed and used bake/cook-off events as boundary spaces for enhanced understandings of cookstove use. The translation and interpretation in the various contexts in which the bake/cook-off events were subsequently organized and in the testing of the use of cookstoves in prolonged field research were key for their insights into the understanding of the use and rejection of improved cookstoves. The different contexts cross-fertilized their understanding and contributed to a greater robustness.

Translation was a central element for the nine tools of cooperation that were used by Slezak et al. Translation spanned joint data collection, the integration of local knowledge, and gender-sensitive workshops and public conferences with practitioners, decision makers and scientists. However, the project had a natural scientist language orientation and, at the beginning, did not reach a level at which discourses on findings could be translated into other disciplines or into other social and cultural contexts. Thus, the impression emerged that only natural science language mattered, and this was challenged at the many workshops in which a more common type of language was an issue. This meant that discussions framing the concepts by using natural sciences would not take the project far enough, and it became evident that social sciences, as well as local knowledge, were key elements that needed to be incorporated.

With respect to language and translation, we conclude that openness in the research process for corrections and greater inclusion characterizes the approach for "sharing" in collaborative and integrative research on African environments.

6.5. Turning points in collaborative research processes

Finally, the liminality of learning experiences, as expressed in what we call distinct turning points, is a characteristic of the specific contributions that make up this edited volume. In each of the four contributions it is possible to detect such moments of experienced change. Living through these allowed the researchers to continue to, and to complete, the next stage of the project. In Prudat et al.'s case the turning point happened between the researcher and the local assistant who jointly found a way to translate, interpret and, finally, to make sense of rather controversial data and insights. The turning point in Jewitt et al.'s account was the first bake/cook-off event that was used for the systematic collection and understanding of diverse preferences, making use of this boundary space for including many perspectives and opening up space for interpretation.

In Oyama's case, we detect a turning point after he consulted with the village leaders and started partnering with local people to hire them for work. In his writing, his language changes from "I" to "we". Together, they started to develop and test a solution to a wicked problem, that of enhancing soil fertility and fodder production, with a potentially mitigating effect on smouldering conflicts about land. Together they seem to have been united and determined to create a situation that might enable the local people to deal with the fragility and temporarily reduce the environmental and social pressure.

Several turning points can be detected in the account by Slezak et al. While the project was set up as a senior-level transdisciplinary research partnership, it was the group of students who managed to include local knowledge in the overly expert (natural) scientific notions of the problems. The group of students expressed an openness towards local fishery experts in the community, and started to interact directly for longer periods of time with local fishermen, enabling them to shape and influence the research practice by direct communication and exchange. Like Oyama's turning point, a joint fishing technique was developed as a consequence of this. The joint technique allowed for a comparison of catch issues at the various sites. This included not only word for word translation but also the translation of concepts concerning water and fisheries.

In a later stage of Slezak et al.'s project, another turning point was marked by the challenges emerging with respect to gender, which became important during the different workshops. At some point it became clear that the procedures in the workshops excluded women from the discussion processes,

and implied that their knowledge mattered much less than men's knowledge framed in development language. This created space for more nuanced reflections on the inter- and transdisciplinary setting of the project. However, it required facilitators who were open-minded and bold to address unequal power and gender relations in the research process, which had been structured as participatory and collaborative but was shaped by specific mind-sets and epistemological traditions.

To conclude, unplanned and unanticipated chances and challenges emerge in collaborative and integrative research. Being open to and respectful of the diversity of actors, both researchers and researched, and of their perceptions and contributions, can enhance learning and the facilitation of a common understanding of key aspects in researching African environments. However, as with the action anthropology and constitutionality approaches, these cases show a central finding: being open to the unexpected and learning from these experiences as well as reducing the power of white, male, northern-based researchers in scientific contexts is a key element of moving towards shared research. Only when this power asymmetry is reduced might research become more participatory, and this participatory research will also lead to better scientific outputs, as it profits from more detailed knowledge and is a better basis for action.

6.6.   Towards shared research

This edited volume was produced with the intention of drawing attention to the twists and turns that emerge in intercultural, interdisciplinary and transdisciplinary, participatory and integrative research in African environments.

Our call for "shared research" emphasizes an openness to use diverse perspectives and not to shy away from the complications and complexities of local knowledge and development contexts. It should encourage and motivate the creation of direct encounters between researchers and researched in various contexts for production processes of joint knowledge, combining various concepts of management and development. We conclude with three final suggestions:

- *Making room for long-term research engagement with extended fieldwork stays in local and regional contexts*: Long-term research engagement enables local voices to be heard and understood. At the same time, it

enables local actors to be in a position to understand the views of external researchers and experts. This happens by the sharing of everyday activities and living conditions, and is supported by applying a participant observation research methodology. Long-term research engagements can create trust, a key element for exchanging information with each other and knowing that all parties are trying to understand each other. For researchers, this requires an openness to local ways of doing and seeing things. One researcher who adopted this principle with complete success was none other than Alexander von Humboldt, who, while being extremely interested in natural scientific data, always showed an interest in local views and rationales. To him, these were as important as the European western scientific views he represented (see Eibach 2012, Wulf 2016). In addition, contextualization matters.

- *Contextualizing research projects, by referring both to diverse scientific contributions (including those published more than five years ago) and to the global drivers that shape development and livelihood contexts today*: Without a concise contextualization of legal and power-specific issues there is little room for collaborative research. Trying to understand not what reality is in singular terms but what the elements of the different views on realities are is a crucial step in participatory and integrative research in African environments. Including local views at the same level as scientific language and knowledge leads to more robustness in the research process and a better preparation for outreach and implementation of the research results. Such shared research evolves from "they do it" to "we do it". Obviously, there are risks: such processes are emergent and often unpredictable, and they can suffer from drawbacks such as those represented in gendered patterns of knowing or epistemological dominations. Contextualizing thus also means providing spaces and platforms for direct and open discussion and constructive, inclusive debate.

- *Making research processes and methodological challenges more explicit*: Last but not least, we set out one of the important lessons of this collection of articles. "Shared research" is not a one-way street, but is full of twists and turns as well as conflicts. An analysis of the processes that are occurring, and speaking about and discussing where the team, with its different parts and functions, stands are of central importance in finding ways for continuing the shared research process. Being more explicit about the research process and the methodological challenges of research endeavours is a way to give justice to the multiple learning loops and the emer-

gent character of results in researching the wicked problems of today (see KFPE 2018).

All these elements echo the beginnings of action anthropology and constitutionality processes, and indicate that "shared research" can be a starting point but must also be a self-reflective process that should anticipate the different interests and power relations of all the stakeholders. The challenge of "shared research" is to keep the process running in a participatory way and to mitigate power asymmetries. It also enables mistakes to be made but gives the capacity to learn from and be creative about them. This edited book tries to provide an input for this type of co-research and learning.

6.7.   References

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