A Mixed-Methodology for People in Nature (PIN) Landscape Assessment of Biodiversity-based Systems

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Introduction

The aim of the People in Nature (PIN) knowledge basket is to promote the uptake of existing knowledge and generate new knowledge on the interrelationship between humans and nature, focusing on the use of and reliance on species and ecosystem services and their contributions to local livelihoods and well-being. PIN is a knowledge basket,

containing approaches, tools and standards and associated capacity building tools to increase understanding of the interrelationship between people and ecosystems. Through its development and application, PIN will promote better data collection, documentation and understanding of local social-ecological contexts that are relevant to policy formulation and development interventions and that result in tangible improvements to livelihoods and well-being.

In this discussion paper a mixed-methodology is discussed and proposed to undertake landscape assessments of biodiversity-based systems as the methodological framework of the PIN knowledge basket. A mixed-method approach combines qualitative and quantitative methods to collect and analyse data about a complex problem (Creswell 2008). As nature is a complex, culturally constructed term it has been necessary to establish conceptual approaches to the interrelationship between humans and nature. For the purposes of this methodology our interest is in what we term the biodiversity-based system to emphasize our interest in both the components of nature and the interactions amongst those components at multiple organisation, geographic and temporal scales. We understand biodiversity as "*the variety of life on Earth at all its levels, from genes to ecosystems, and the ecological and evolutionary processes that sustain it*" (Gaston 1996). For the purpose of this paper we refer to species (including subspecies, varieties and races) and ecosystems with which people interact and which produce services that benefit people. Similar to recent work on social-ecological systems, we recognize that biodiversity-based systems include humans as part of the system. The biodiversity-based system is co-produced and therefore emerges from the interactions between people and the environments in which they live. We also recognize that this complexity requires starting points to trace the interrelationships that constitute the system. In this iteration of the methodology we begin with an approach to trace the biodiversity-based system while recognizing that tracing water-based systems and the interactions amongst these two is also important and requires further methodological development.

In beginning with the biodiversity-based system we build upon existing strengths within IUCN and its focus on biodiversity including relevant datasets and methodologies. This is also consistent with approaches derived from the Millennium Ecosystem

Assessment (MA) that applied the concept of ecosystem services, including a category focused on provisioning and a category related to cultural ecosystem services (MEA 2003). One of the critiques of previous work on ecosystem services is that services are themselves shaped through the interrelationships of people with ecosystems and as such use is shaped by a complex set of variables that can change over time (Bieling et al. 2014, de Oliveira and Berkes 2014). Some have also noted that the cultural services category appears as a residual category in which services not easily attributed a monetary value were placed (Chan et al. 2012). The Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) has made efforts to address the issues related to cultural ecosystems services in their framework by incorporating categories that are analogous to other knowledge systems, such as labeling 'ecosystems goods and services' also as 'nature gifts' (Diaz et al. 2015:5). This perspective, however, still favours dualistic, Western ontologies that see nature at the service of humans as opposed to relational ones that deal with humans as interconnected with nature (Ingold 2011). These critiques inform our development of this mixed-methodology for landscape assessment of biodiversity-based systems and are conceptually explored in more detail in another discussion paper (Davidson-Hunt et al. In press).

In this discussion paper we explain and outline the choice of an exploratory mixed-methodology design and then provide an overview of the workflow, phases and steps within each phase. While we indicate linkages with specific methods for the modules, the purpose of this paper is to provide an overview of the approach recognizing that there are complementary methodological toolkits developed by IUCN and others that can be used to collect the data and/or undertake participatory processes with Indigenous Peoples and Local Communities (IPLCs). In documenting the biodiversity-based system, we propose data standards for using secondary data sources and for the collection of primary data, including documentation of use of species and associated cultural processes, cultural associations with biodiversity and cultural elements found within landscapes. Recognizing that an approach that focuses on biodiversity and species is based on a western perspective and understanding of nature, we also include within the methodological framework a module that allows for broader narratives nested within alternative ontologies to build different perspectives on how to understand the

interrelationships between people and nature. We conclude the discussion paper by exploring linkages with other IUCN knowledge products and methodological considerations that need further development.

PIN exploratory mixed-methodology for landscape assessments

Mixed-methodology has become increasingly prevalent as an overarching research framework to understand the complex interrelationships between humans and their environments. Mixed-method studies are often linked to a pragmatic worldview in which researchers and practitioners use the approaches, methods and resources available to deal with a specific problem (Creswell 2009). Those who adhere to this pragmatic worldview as part of their research paradigm find it a useful way to bring together quantitative and qualitative data to address applied research questions. In the social sciences this would be seen in contrast to a post-positivist worldview. Post-positivists hold to the position that credible, valid and legitimate knowledge is best produced through the use of the hypothetic-deductive scientific method utilizing quantitative data. This is the dominant approach in the natural, engineering and medical sciences and present in the social sciences of sociology and economics. In the social sciences, however, post-positivist approaches contrast with others that view the production of knowledge through many different lenses such as interpretive, phenomenological and emancipatory. In these cases, the construction of meaning is emphasized as well as the political processes by which knowledge is constructed. What unites these is a commitment to qualitative approaches, some which may collect data to understand a research question or problem, and some that may focus on the processes and the knowledge generated as a means to political emancipation (Creswell 2007, 2008).

Adherents to these various research worldviews focus on the use of different ways of producing knowledge to answer the problem at hand and recognise that IPLCs have different understandings of, and interact differently with, nature. A mixed-methodology not only recognises that quantitative data can shed light on a problem, but also that peoples understandings, meanings and values in relation to an applied problem add nuance, texture and detail to quantitative data and are necessary in generating solutions with broad legitimacy (Johnson et al. 2007). In early PIN workshops it was recognized that both approaches are necessary to co-produce knowledge useful to influence policy

domains and to provide relevant solutions for work undertaken with IPLCs.

The challenge with mixed-methodology is in how to sequence, relate and analyze diverse methods of data collection, participatory processes and resulting sets of data and knowledge within multi-year, interdisciplinary research programs. While there is much discussion about these issues in the literature there is no clear consensus on the degree to which different knowledge sets must be integrated within a mixed-methodology (Clark et al. 2008; Cresswell and Clark 2008; Morse and Niehaus 2009). Generally, authors consider the point at which the quantitative or qualitative methods are implemented and when, or whether, data integration occurs within the workflow of the research program along with the priority given to the different types of data.

Using these characteristics Clark and Creswell (2008) have identified four distinct mixed-methodology designs: triangulation; embedded; exploratory and explanatory. Triangulation undertakes quantitative and qualitative data collection concurrently, gives equal weight to both and data is integrated during the interpretation phase. Embedded designs prioritize one and embed the other within the research design and either collects the two types of data concurrently or sequentially. However, the embedded data is integrated into the dominant data collection frame through analysis.

Exploratory and explanatory designs are similar in that they sequence one type of data collection prior to the other and often one takes precedence over the other. Explanatory differs in that quantitative methods are used to characterize individuals within a population and the qualitative approaches are used to explore the traits of interest to the research question. An exploratory design, on the other hand, is used when knowledge of the research question is limited and the design of quantitative methods is not possible using existing knowledge. In this case, qualitative approaches can be utilized to increase the understanding of the research question within a specific context and then used to design quantitative instruments aimed at gathering specific information about the study site. It is this latter approach that has guided the development of a mixed-methodology for PIN landscape assessments of biodiversity-based systems.

The PIN landscape assessment of biodiversity-based systems has been developed as an adaptive two phase workflow allowing teams to build upon existing knowledge and

utilize qualitative and quantitative data collection methods as appropriate. It has also been developed so that it can be participatory from its inception in identifying the challenges, problems or questions to be examined during the assessment as well as in how data can be collected, analysed and interpreted. Recognising that work with IPLCs may not provide for integration of knowledge produced through the assessment, there are provisions for integration as well as allowing knowledge produced to stand independently similar to recent discussions regarding multiple-evidence based approaches (Tengö et al. 2014). The mixed-methodology also allows for participatory approaches both during the inception of a landscape assessment as well as in the choice of methods employed. This approach allows for the standardization of information regarding the use and cultural values of biodiversity and water when appropriate as well as more narrative approaches for understanding the interrelationships between humans and nature.

PIN mixed-methodology workflow

The PIN mixed-methodology (Figure 1) has three interdependent phases: situation analysis (Phase I)**,** qualitative and quantitative data and cultural narratives collection (Phase II) and a data integration and analysis process aimed at stakeholder driven action planning, monitoring and feedback processes (Phase III). This mixed-methodology follows protocols to examine interrelationships with nature according to the ethics and institutions of the community with whom the assessment is being conducted. It also follows guiding principles to ensure that the information gathered and the networks established are relevant to the objectives of the landscape assessment and in line with IUCN working parameters and PIN needs. This methodology is also sensitive to the interactions between power and knowledge at the community level in terms of gender, class, age and ethnicity.

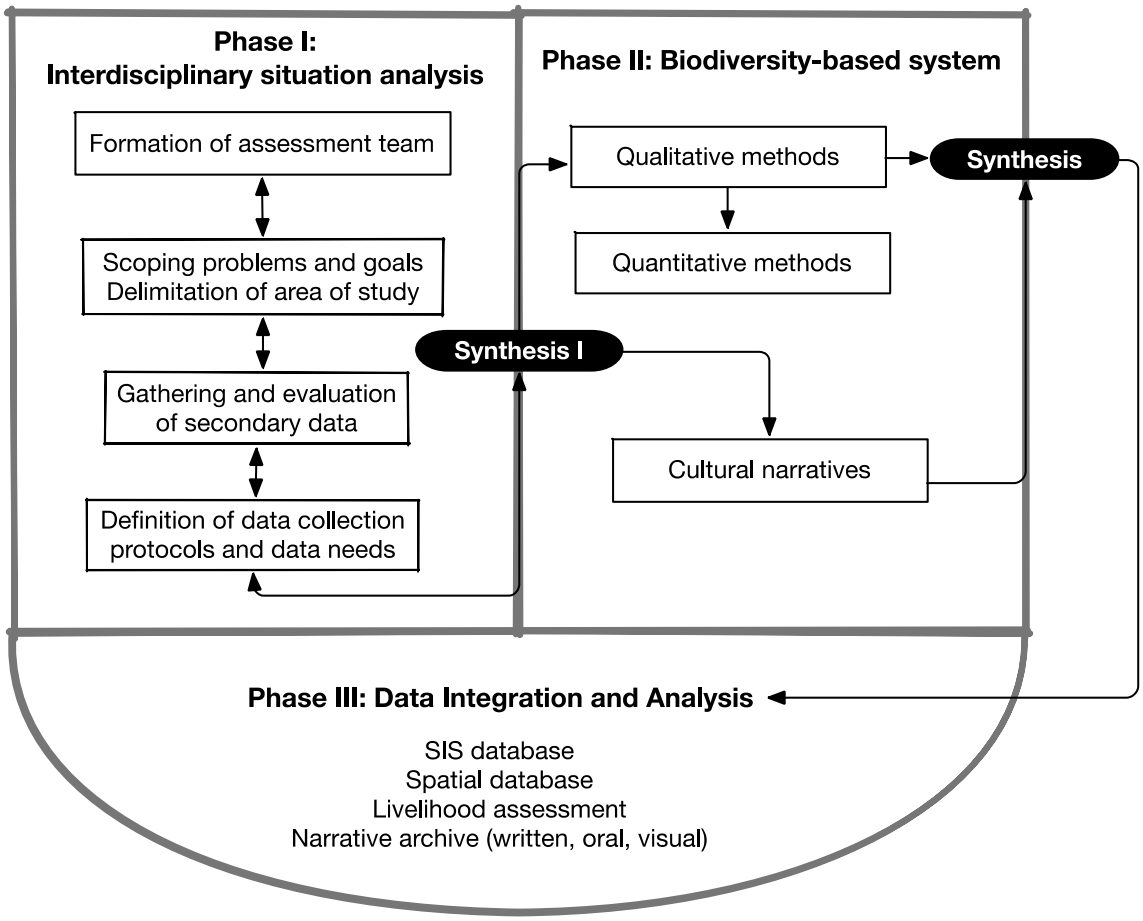

Figure 1: PIN landscape assessment toolkit

Developing protocols for how to examine interrelationships with nature

Collecting information about IPLCs' knowledge and their territory is a sensitive endeavour that requires agreement with those IPLCs about what data can be gathered, produced and made public (Davidson-Hunt and O'Flaherty 2007, Robson et al. 2009). The PIN team can draw upon previous experiences that have dealt with such concerns through the development of initiatives that grant the right to free, prior and informed consent or codes of ethics that regulate the types of information being gathered and the ways in which researchers and practitioners should interact with Indigenous peoples. The United Nations Declaration on the Rights of Indigenous Peoples (UN 2008, Articles 10, 11, 12, 28, 29 and 32) established free, prior and informed consent as the right Indigenous peoples have to actively participate, according to their own rules and institutions, in decision-making processes associated with projects and actions that in any

way impact their land, resources, knowledge and culture. Building upon the right to free, prior and informed consent, the United Nations for Reducing Emissions from Deforestation and Forest Degradation (REDD+) has developed a Biocultural Community Protocol as a methodological tool to safeguard Indigenous and local knowledge and rights throughout the life of payment for ecosystem projects that affect the access to benefits indigenous peoples receive from their territories (Anderson 2011, UN-REDD 2013). This is an example of a standard already utilized by IUCN for the collection of data with IPLCs and could be utilized as part of PIN.

Another example of these protocols, the Code of Ethics developed by the International Society of Ethnobiology (ISE 2006), represents an effort on behalf of academics to foster ethical, responsible and just collaborations among scholars, practitioners and Indigenous and local peoples in agreement with local rules and institutions and national and international law and policy. This code emerges from the awareness of the harm that research without consent has caused Indigenous peoples and aims to create spaces that support local development initiatives and the continuity of cultures and language, and acknowledge intellectual property rights. The code applies to the management of information, such as collections, databases, publications, images, audio or video recordings, resulting from research on Indigenous and local knowledge as well as lands and resources that are part of their biocultural heritage. The code also proposes a set of seventeen principles and twelve practical guidelines that should inform the undertaking of activities with Indigenous peoples, their resources and within their territories. Both biocultural community protocol and the code of ethics provide implementation guides that detail steps from initial contact with the community, through the definition of objectives and discussion of available information, decision-making, negotiation with community and other relevant stakeholders, to implementation of the landscape assessment and dissemination of results. Each PIN landscape assessment will be accompanied by a protocol agreed upon amongst the formal, informal authorities and PIN team involved. This protocol identifies the objectives and defines a strategy to collect and analyse data as well as defines the relations between community beneficiaries and intervening agencies in terms of the data that can be collected and made public. The main goal of developing this kind of protocol is to ensure that the communities in the

assessment sites are and remain in the driver's seat of the process and that the PIN team and associated intervening agents take on and remain in a facilitating role (Davidson-Hunt and O'Flaherty 2007).

Guiding principles

The PIN mixed-methodology has been designed to follow a set of guiding principles to ensure that the information gathered and the networks established are relevant to the objectives of the assessments they precede and that they are in line with the underlying principles and data needs of PIN. We identify two central guiding principles: participatory and systems based (IUCN nd).

Participatory: PIN assessments are conducted with stakeholders from the assessment area and with partners that provide access to expertise and information. This ensures that the design and deployment of an assessment includes key issues as identified by relevant stakeholders.. Working with stakeholders and partners allows a more accurate assessment of what information is already available, what the gaps are and what interventions are already in place. A methodology conceived to be participatory from its outset also opens the possibility of generating spaces in which people can share perspectives about particular issues, build capacity and develop particular skills for data gathering and monitoring.

Systems approach: The PIN methodological framework follows a systems approach, which integrates knowledge and experiences from outside the area of the PIN assessment with the information gathered in the assessment area. A systemic approach to interrelations between people and nature takes into consideration not only the direct interactions people have with biodiversity and the ecosystems in which they live, but also the broader context in which these interactions take place. The assessment may use studies from sites with similar livelihoods and ecosystems, including what data collection strategies have worked and why. Information about income, health, and education for example can contribute to understanding what allows or hinders access to and benefits from biodiversity.

Phase I: interdisciplinary situation analysis

What is an interdisciplinary situation analysis?

A situation analysis is needed to understand the broader context in which projects and assessments take place so that these can be designed accordingly (MacKinnon et al. 2012, Try and Chambers 2006). Phase I of the PIN mixed-methods approach is an interdisciplinary situation analysis (ISA) that provides an understanding of the broader context in which a PIN assessment takes place. An interdisciplinary team tasked with executing the assessment identifies key stakeholders, identifies the objective of the assessment, scopes the appropriate area and builds the baseline of the assessment. ISA draws upon the situation analysis approach and methods developed by IUCN programmes such as IWAT and HighARCS (IUCN nd, Springate-Baginski et al. 2009) as well as SocMon (Bunce et al. 2000, Bunce and Pomeroy 2003), and is sensitive to assessing biodiversity, its uses, and understanding its relations to local livelihoods and cultural meanings.

By providing a basic understanding of the context of an assessment, what information is available and what are the knowledge gaps, the ISA guides strategic decisions about data collection in Phase 2. An ISA is also useful for establishing working relations with community leaders and organisations, government authorities, non-governmental organisations and researchers active in the area of the assessment. Stakeholder identification and engagement makes it possible to identify areas of potential cooperation and/or conflict. The main purpose of an ISA is to contribute to the construction of a secondary data baseline that will serve as the basis for identifying knowledge gaps and designing data collection strategies according to the needs of the assessment without duplicating efforts.

Implementing an Interdisciplinary Situation Analysis

The ISA takes place in five steps: establishment of the assessment team, identifying the key challenge to be tackled and the objective of the assessment, selecting the boundary of the assessment, gathering and evaluating secondary data, and defining data collection protocols to guide appropriate data collection in Phase 2 (Figure 2). An evaluation of

outputs after each step allows for addressing any persisting gaps in the event that other skills are needed, objectives need revision or more relevant information surfaces. The outcome of an ISA consists of a report that contains a description of the challenge addressed, the objective of the assessment, comprehensive inventories of relevant information from multiple sources, identified information gaps, and a preliminary/proposed set of data collection protocols.

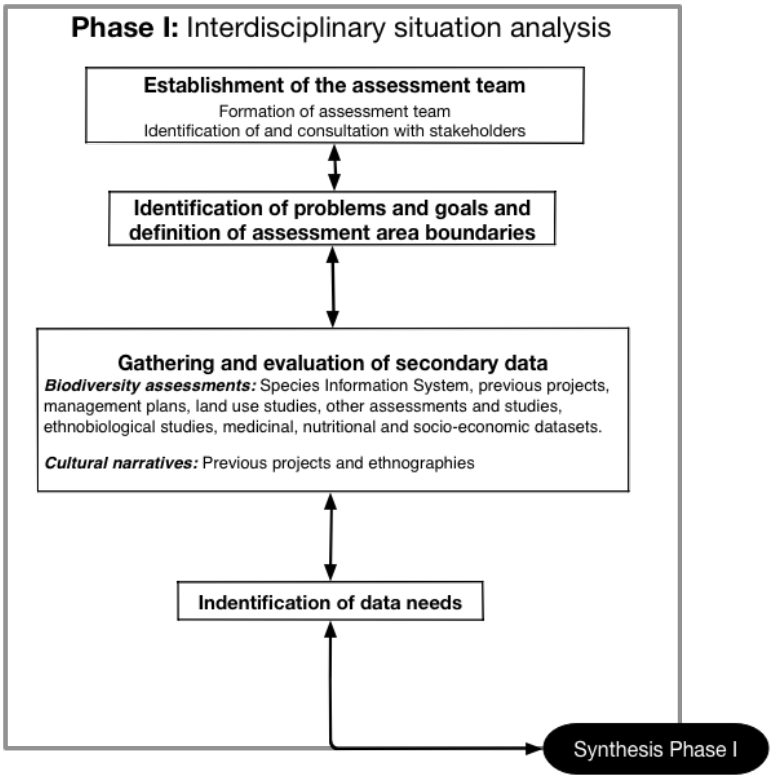

Figure 2. Phase I

Formation of assessment team

The formation of the PIN assessment team brings together members of the PIN core and steering groups, regional IUCN offices as well as researchers, NGO representatives, government authorities and key community members from the region and site. Having a team with a diversity of disciplinary backgrounds and sufficient knowledge of the assessment site will ensure that the assessment provides information and knowledge most relevant to the issue identified.

Initial scoping of goals and problems and delimitation of assessment area

The objective of the assessment is negotiated and agreed amongst the stakeholders and made explicit at the start of the ISA. The views of stakeholders associated with the

assessment area should be reflected in the identification of goals and challenges to address (Springate-Baginski et al. 2009).The objective may be refined at the end of Phase I. The boundary of the assessment should be defined by the assessment objectives. Assuming that a PIN assessment will be implemented within IUCN projects, the boundaries of the assessment should be set by the area that is expected to be affected by the project. A PIN assessment site can be an ecological area, such as a watershed, an ecosystem, the distribution area of a species, or the area in which a particular livelihood or cultural practice is undertaken (Springate-Baginski et al. 2009). Knowledge and skills from the assessment team, available resources, and the social and economic reality of the site should be also taken into consideration in the delimitation of the assessment site area.

Gathering and evaluating secondary data

This step brings together available information from the region in which the assessment is situated. Compiling information at the regional level allows the team to understand the composition, ecology and uses of biodiversity in the study area as well as the pressures and drivers that threaten biodiversity and access to it (Springate-Baginski et al. 2009). Secondary data used in the ISA include biodiversity information from IUCN's Species Information Service and the Red List of Threatened Species as well as information from previous projects, management plans and land use studies. Other studies related to uses of biodiversity may provide complementary information about the value of biodiversity from the perspective of its use domains (e.g. food and nutrition, medicine, trade) for IPLCs. Likewise, demographic and socio-economic datasets can provide insights about the role of biodiversity in local livelihoods and its governance and institutional environment. Finally, ethnographies about the cultural groups in the region provide perspectives about the cultural value and local perceptions of biodiversity.

Identification of data needs

The gathering and evaluation of secondary data will make information gaps and needs apparent (Bunce and Pomeroy 2003). In this step the team should propose an outline of data collection protocols that guides data collection based on identified data needs and resources available.

Synthesis of Phase I

The synthesis of Phase I brings together the protocol negotiated among the stakeholders involved in the assessment, the initial objectives, a review of secondary data available and an identification of information gaps. Based on these products, the refined objectives of the assessment and the correspondent methods to be employed in Phase II will be proposed. These objectives and methods will become a roadmap indicating what kind of information can be collected and what protocols are needed to ensure that information is collected according to the ethics and worldview of the people involved.

Phase II. Examining the biodiversity-based system

Phase II provides an empirical assessment of how communities benefit from biodiversity by collecting qualitative and quantitative information on the biodiversity-based system as well as narratives about nature and interrelationships with it (Figure 3). The biodiversity-based system refers to the examination of species and the meshworks they form as they move across the landscape from their sites of harvest and production to markets and consumption sites (Davidson-Hunt et al. in press; Ingold 2012). The provisioning / use focus of the PIN assessment considers use through the activities of appropriation, transformation, exchange and consumption. Each activity brings together harvesters and other human actors with different backgrounds, including gender, ethnicity and age, along with biological material, technology and infrastructure and knowledge to accomplish a particular objective in the context of formal and informal rules and institutions (Davidson-Hunt et al. In press).

Qualitative methods gather descriptive and open-ended data about people's interactions with nature. Qualitative data include general information about demographic trends and governance systems. It also includes information about biodiversity from the perspective of its users at the species level, including local taxonomies of the species people use, their uses, the local harvesting calendars and perceived threats to species. Qualitative methods also account for how biodiversity is distributed at the landscape level, the conditions that enable and hinder access to it, its value chains and the drivers that change the relations with it. Meanwhile, quantitative methods gather data about the individuals and households involved in the harvest and production of biodiversity that

can be transformed into numbers and analysed statistically. Examples of this quantitative data include household profiles, accounts of harvesting and productive systems as well as measurements of amounts and value of products traded in markets. The narratives of interrelationships with nature provide a space for community members from the assessment sites to represent their relations with nature according to their own perspectives and the way they consider most appropriate.

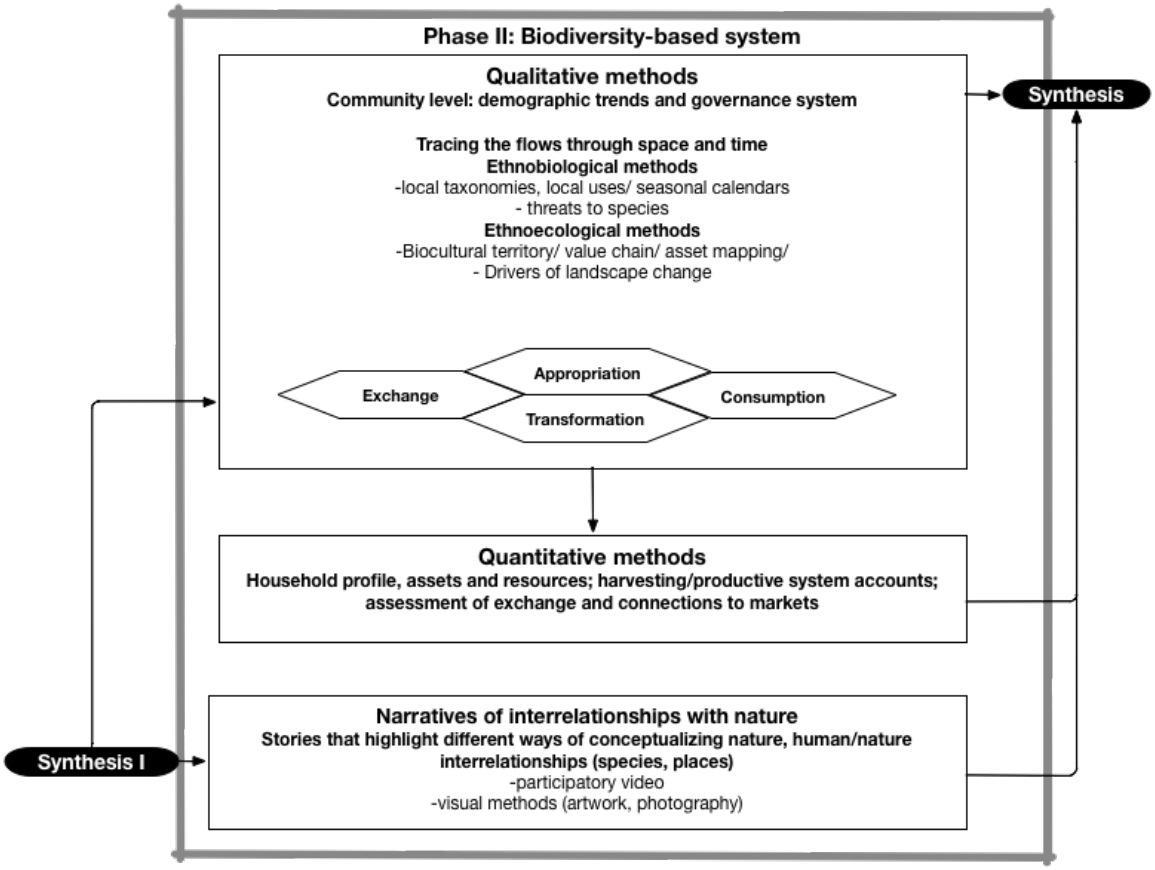

Figure 3. Phase II

Qualitative Methods

Community-level: Understanding demographics and governance

This step can employ qualitative, open-ended methods, such as participant observation, interviews with key informants and mapping exercises to describe the socio-economic-ecological dimensions of the assessment site. Semi-structured methods including village questionnaires, focus groups and participatory rural appraisal, can be tailored using secondary data from the ISA and analysis of the results of the open-ended methods. The

appropriate methods will be partly defined by the assessment's objectives and the information is already available from Phase I. In cases were there is no available information, the use of quantitative methods to collect data on demographic variables may also be appropriate.

According to the particular needs of a PIN assessment, different methods can be bundled to address specific data needs. While methods that rely on individual informants, such as key informant interviews, provide detailed information, focus groups and village questionnaires allow discussion of contentious issues. For example, demographics variables collected in Phase I can be updated through data collection at the assessment site. Local government representatives and leaders can provide information on demographic variables such as population and population dynamics, number of households, migration, age, gender, levels of education, religion, and language. Depending on time and community availability, this information can be gathered using individual key informant interviews or focus groups. Village questionnaires or elements from the Participatory Rural Appraisal toolkit (Mukherjee 1993) can provide a general idea of livelihoods and sources of income in a given site (see Springate-Baginski et al. 2009).

The biodiversity-based assessment at the community level employs a diverse set of tools to enquire about the understanding people have of the biodiversity they use and to enquire about the variables that mediate the relations people have with nature at this level. Focus groups are useful to estimate the number of households that depend directly and indirectly on local ecosystems and biodiversity. Similarly, key informant interviews, mapping exercises and participant observation can be used to understand the activities associated with biodiversity, where these activities take place and what species and varieties are used and for what purposes. Village questionnaires and focus groups can identify important species used and products, availability, trends, what is needed to increase the benefits people receive from natural resources. Seasonal calendars and cyclical changes and events provide complementary information. While the village questionnaires provide descriptive information about what species are used, when and how their abundance has changed in recent history, the focus group offers a space to

discuss these aspects in order to gather multiple perspectives about underlying issues affecting both availability and access to biodiversity..

The governance category looks at formal and informal rules and legislation as well as the stakeholders associated with the management of biodiversity at the site level. In addition to identifying governance structures through secondary sources, key informant interviews can be used to understand how management plans and legislation are applied in situ. While rules and regulations can be described using key informant interviews, village questionnaires or focus groups, key informant interviews and focus groups are also useful to understand land tenure patterns. Community and stakeholder organisations can also be assessed using key informant interviews.

Examining the biodiversity-based system at the individual and household level

This qualitative data section collects information about the biodiversity-based system at the individual and household level using: biodiversity surveys, ethnobiological assessments and ethnoecological assessments. The biodiversity survey assesses specific groups of species identified by stakeholders in previous steps. Species assessment methods provide information on species distribution and threats. The collation of these assessments provides a basis for spatial analyses at the ecosystem and landscape level. In parallel or sequentially to the biodiversity assessment, ethnobiological and ethnoecological assessment methods are deployed. Ethnobiological methods gather information at the household level about direct interactions between people and biodiversity, identifying local names and use of species, seasonal calendars and perceived threats. Ethnoecological methods gather data about the relations that emerge out of the interactions between people and biodiversity at the community and regional levels in the context of the biocultural territory, value chains, assets, and with respect to political, cultural and ecological relations.

Quantitative Methods

Household surveys gather quantitative information about interrelations between humans and nature at the household level. As in some IUCN projects, the survey may focus on dependence using a household income accounts approach. Other IUCN programmes have worked with the Forest Poverty Toolkit, which uses participatory methods to understand people's dependence upon nature. As household surveys can require significant

investment, survey instruments developed should be based upon information gathered in Phase I as well as the findings emerging from the application of qualitative methods. Household surveys can be avoided in case the data gathered in Phase I and using qualitative methods is deemed sufficient to cover the data needs of a given assessment.

A number of survey instruments have been developed by IUCN and other agencies. PIN landscape assessments may draw upon survey instruments developed initiatives such as SocMon, FLEG, IWAT/HighArcs based on the Sustainable Livelihoods Approach (SLA) developed by the UK Department for International Development (DFID) and researchers at the Institute of Development Studies in Sussex (Scoones 1998) and the Resources and Needs Questionnaire (RANQ) toolkit developed by the Wellbeing in Developing Countries working group (Gough and McGregor 2007). Common to these methodologies is that they acknowledge rural livelihoods as diverse and that rural populations combine multiple activities, sources of income as well as priorities and aspirations (White and Ellison 2007). A more detailed discussion of the tensions between the SLA and wellbeing framework can be found in the PIN discussion paper on Livelihoods, Poverty and Wellbeing (Suich et al. in prep). Appendix X compares the household survey instruments from SocMon, FLEG, IWAT and RANQ, highlighting the elements that could be used to develop a PIN household survey tool. This appendix focuses on information about household profiles, assets and productive activities, harvesting activities, perspectives on biodiversity's availability and governance system.

Narratives of interrelationships with nature

While the previous two steps in Phase II employ qualitative and quantitative methods to examine people's relations with biodiversity (e.g. species and ecosystems), this section proposes a participatory approach aimed at examining how IPLCs in a PIN assessment site understand their relations with nature from their own perspectives. We begin with the premise that, although it has "concrete biophysical referents," biodiversity is a social construct that responds to a way of ordering the natural world according to artificial categories around which actors with different degrees of power converge (Escobar 1998: 53). Reducing biodiversity to genes, species and ecosystems imposes a colonial epistemology and ontology that does not pay sufficient attention to how local people

interact with, understand and produce knowledge about nature (Viveiros de Castro 2004). This imposition often results in misunderstandings about management and conservation objectives between IPLCs and environmental authorities or other stakeholders with vested interests in the conservation of nature (Blaser 2009).

Indigenous people have a particular way of interacting with nature based upon their cosmology and historical relation with the territory they inhabit (Davidson-Hunt 2006). PIN aims to provide a mechanism and space to document people's stories employing participatory ethnographic methods. We recognize that "community" is not a homogeneous category and that there is a need to represent voices and perspectives informed by gender, age, ethnicity, and class. The selection of methods employed to gather and represent the narratives will be discussed among stakeholders, but people from the assessment site will guide the process and select the format and approach employed for making the outcome public. Video documentaries, paintings or photo essays are examples of possible outcomes for this step in lieu of or to complement a written report. By opening up alternative pathways to understand the interrelationships between people and nature this component of PIN will allow for richer contributions from IPLCs.

Synthesis Phase II

The synthesis Module II is a participatory assessment that brings together biological, ecological and local knowledge of biodiversity employing not only qualitative and quantitative data, but also the narratives of IPLCs. It provides scientific knowledge about the taxonomic identification, distribution, abundance and threats related to key species. It also catalogues available local knowledge in terms of names and uses of key species as well as the formal and informal rules that define the local management system. The synthesis describes the role that biodiversity plays in the livelihoods and wellbeing of stakeholders at the assessment site. The biodiversity-based system framework allows for the study of variables that facilitate and impede flows of biodiversity across the landscape and the benefits and costs generated and borne by people at the sites of appropriation exchange, transformation and consumption. The qualitative biological and ecological information gathered through this step not only provides an descriptive understanding of the ways by which IPLCs use and benefit from biodiversity, but also provides the basis to design household surveys that in turn gather quantitative information about the

productive activities, resources available, amounts of resources harvested and produced as well as consumed. Narratives about interrelationships with nature provide a platform for IPLCs to articulate their relations with nature from their own perspectives.

Integration with IUCN knowledge products

Early in the process of PIN development it was recognized that if information was collected using the species as an analytical unit there was the possibility to utilize the IUCN Species Information Service as (i) a source of secondary data about use and conservation status of species and (ii) a repository of data collected through PIN assessments. These possibilities are being explored in the PIN discussion paper on secondary data (Deutsch et al. In Prep). It has also been suggested that the Red List of Ecosystems could provide information related to threats to ecosystems to provide information about the availability and stability of biodiversity used by people. This has not been explored in detail, but has been flagged as an avenue to explore further. Linkages with other knowledge products of IUCN have not yet been identified although preliminary discussions have been held with the Natural Resources Governance Framework due to the possibility that this would include normative frameworks related to natural resource use. This linkage will continue to be explored as that framework is developed.

Next Steps

This mixed-methodology for landscape assessment of biodiversity-based systems represents a novel a to assess the value and contributions of biodiversity to IPLCs. It employs a perspective that looks beyond the monetary or intrinsic value of biodiversity to consider its nuanced and specific contributions to livelihoods and wellbeing at an assessment site. It gives the power to IPLCs to tailor an assessment according to their needs and priorities. The data and other outcomes of this process aim to inform policy and development interventions to support IPLCs defined development pathways as well as needs, desires and aspirations at the individual and household level that contribute to self-determination.

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