Co-enquiry and Participatory Research for Community Conservation:

Methods Manual
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<td>ANAI</td>
<td>Asociacão Nacional de Ação Indigenista</td>
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<tr>
<td>CBPR</td>
<td>Community-based Participatory Research</td>
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<tr>
<td>CR</td>
<td>Community researcher</td>
</tr>
<tr>
<td>CRIPX</td>
<td>Consejo Regional Indígena Popular de Xpujil</td>
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<td>CRP</td>
<td>Community Research and Co-enquiry Protocol</td>
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<td>CSO</td>
<td>Civil Society Organisation</td>
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<tr>
<td>EC</td>
<td>European Commission</td>
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<td>FPIC</td>
<td>Free, Prior and Informed Consent</td>
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<td>GDF</td>
<td>Global Diversity Foundation</td>
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<tr>
<td>INECOL</td>
<td>Instituto de Ecologia, Mexico</td>
</tr>
<tr>
<td>IVM</td>
<td>Institute for Environmental Studies, Vrije Universiteit Amsterdam, The Netherlands</td>
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<tr>
<td>PAR</td>
<td>Participatory Action Research</td>
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<tr>
<td>PM&amp;E</td>
<td>Participatory Monitoring and Evaluation</td>
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<tr>
<td>RTD</td>
<td>Research and Technological Development (Institution)</td>
</tr>
<tr>
<td>TRIZ-OSTM</td>
<td>Theory for Inventive Problem-Solving/General Theory for Powerful Thinking [Acronyms in Russian]</td>
</tr>
<tr>
<td>UAB</td>
<td>Universidad Autónoma de Barcelona, Spain</td>
</tr>
<tr>
<td>UEFS</td>
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I. Introduction

The Co-enquiry Methods Manual is designed as an overarching tool for engaging in co-enquiry processes with indigenous and local communities. It includes arguments in support of co-enquiry as best practice, guidance on how to approach each element of the research cycle using co-enquiry, descriptions of co-enquiry approaches to monitoring, evaluation and dissemination, and reflections on the relationship between co-enquiry and advocacy.

Background
The European Union’s Framework Programme 7 funded the production of this manual (COMBIOSERVE project: January 2012 to January 2015). The manual was co-authored by members of the COMBIOSERVE consortium under the leadership of Global Diversity Foundation (GDF). It is the result of theoretical inquiry and practical experiences of co-enquiry research on the topic of community-based conservation, implemented in collaboration with indigenous communities of the Chinantla region of the state of Oaxaca, in Mexico, as well as of COMBIOSERVE fieldsites of Calakmul (Mexico), Pilon Lajas (Bolivia) and Porto Seguro (Brazil).

GDF collaboration with Chinantec communities

The Chinantla highlands are located in the northern part of Oaxaca state in Southern Mexico. The Chinantla is rich in biocultural diversity. It holds the largest intact contiguous area of the dwindling Mexican cloud forest, and is home to many threatened and endangered species. Chinantec-speaking indigenous peoples, now living in formally recognized community territories, have populated this region for thousands of years.

Since 2007, GDF has worked with three Chinantec indigenous communities in the Tlatepusco river watershed. Here, we have implemented community-based, collaborative research processes to explore the consequences of formal and community-based conservation on natural resource use and community wellbeing, to co-develop community-based adaptive management plans for community territories, and to support communities as they enhance their capacities to manage their territories.

GDF’s role in the COMBIOSERVE project was to help develop a co-enquiry methodological framework to be used to answer a broad range of research questions surrounding the assessment of community-based conservation strategies. Our fieldwork with Chinantec communities consisted of working with community research teams to select appropriate conventional research methods drawn from other research themes within the project, and adapt them for application within a co-enquiry framework.

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1 In this manual, the phrase ‘conventional research’ is used to describe research processes where the researcher is the expert and has control over the design, methods and means for producing knowledge, whereas the subject of research has no control over these processes.
In this way, and in close collaboration with colleagues from the COMBIOSERVE consortium, GDF worked to formalize and commit to paper a co-enquiry approach to ‘assessing the effectiveness of community-based conservation’. In particular, we worked with Instituto de Ecología (INECOL) on developing co-enquiry approaches to biodiversity monitoring and received support from the Institut de Ciència I Tecnologia Ambientals of the University of Barcelona (ICTA-UAB) and Universidade Estadual Feira de Santana (UEFS) on the topic of social sciences and co-production of knowledge.

In addition to GDF’s work with Chinantec communities, COMBIOSERVE colleagues working in the Calakmul fieldsite (consortium members INECOL and CRIPX) and in the Southern Bahia fieldsite (consortium members UEFS and ANAI) adapted methods from their research on participatory biodiversity monitoring and land use change to a co-enquiry approach. Therefore this manual also gathers experiences, expertise and results emerging from these fieldsites and research themes. Specific results from these themes have already been published elsewhere, in particular COMBIOSERVE (2013) and COMBIOSERVE (2014).

This manual seeks to gather and synthesise all of the work carried out on developing and refining a co-enquiry framework during the project. Chapter II, which covers the theoretical background to co-enquiry, was principally authored by GDF. Chapters III, V and VI present the results of Chinantla-based fieldwork carried out by GDF with Chinantec community researchers and in collaboration with other consortium members. While these chapters are authored by GDF, they contain the results of collaborative work; in particular, all of the sections relating to biodiversity monitoring are the result of a joint effort between GDF, INECOL and CRIPX. Chapter IV presents methodological work carried out by other consortium members: here we present both co-enquiry approaches and non-co-enquiry, conventional methodologies developed by COMBIOSERVE.

What is co-enquiry?
Co-enquiry is a research process in which external researchers are the facilitators to a community-led and -controlled process, aimed at addressing community needs. In co-enquiry, the community as a whole takes a leadership role in all decisions regarding research objectives, process, results and dissemination. Community researchers are in charge of adapting and implementing the research methods to respond to community needs. The external researchers are facilitators, supporting the community researchers in their work and, if asked, the community, in their decision-making processes. Co-enquiry is about much more than research: as this Methods Manual will show, it is about politics and power, and about supporting communities as they empower themselves and take control of their futures. From the decolonisation of research practice, co-enquiry becomes a path towards self-determination (see Smith 1999).

Do we need another manual?
Participatory research has at least 30 years of history. Scholars and practitioners have already developed manuals for its implementation (for example, Pretty et al 1995; Bellon 2001; Slocum 2003; Gonsalves et al 2005a, b, c), a dedicated website (www.participatorymethods.org) and a practitioner’s journal (Participatory Learning and Action, published by IIED). Co-enquiry, however, is different to participatory research.
It goes beyond the ‘sharing of power’ approach that a number of variants of participatory research propose: it seeks to put the control of the research into the hands of the communities. While co-enquiry is increasingly being implemented in community-based research, so far there has been no concerted effort to produce an accessible, hands-on implementation manual for wide dissemination and use, published in different languages (to date: English and Spanish).²

**Objectives of the present manual**

This is the first co-enquiry specific manual that provides step-by-step instructions for carrying out co-enquiry as well as exploring, and finding solutions for, the possible stumbling blocks that researchers and communities encounter as they engage in co-enquiry research. It seeks to dispel some of the myths surrounding the impossibility of carrying out mutually beneficial research while also acknowledging the complexities and power dynamics inherent to the relationship between research institution and community.

The manual collates and summarises current state-of-the-art knowledge and theory on diverse aspects of co-enquiry. It also innovates, building on this state-of-the-art knowledge, by providing grounded theoretical advances that are drawn from field experiences targeted at testing the co-enquiry method.

Amongst others, the manual provides:

- An overview of the arguments for implementing a co-enquiry and mutual learning approach in research for community benefit and emancipation;
- A systematic approach to carrying out co-enquiry and proposals for resolving problems related to implementing a co-enquiry approach in community contexts;
- Specific tools – Community Research and Co-enquiry Protocols – for the implementation of co-enquiry research processes, specifically in the context of community-based territorial management;
- Description of field experiences of co-enquiry approaches to biodiversity monitoring, participatory mapping, and intercultural research training;
- Description of innovative (non-co-enquiry) methodologies developed by COMBIOSERVE consortium partners to respond to research questions surrounding community conservation;
- Co-enquiry monitoring and evaluation tools;
- COMBIOSERVE experiences in co-enquiry dissemination.

**Structure of the manual**

Following this introduction, the manual provides a full background of the concept of co-enquiry, including a discussion of its roots in participatory action research (PAR), the differences between conventional and co-enquiry research processes, and the relationship between co-enquiry and academic research. It then describes the practice of co-enquiry in

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² John Heron (1996) and Peter Reason (1988, 1994) have both written and edited volumes that provide the philosophical underpinnings of co-enquiry, some examples of collaborative research, and some methodological guidance. Nevertheless, these textbooks and manuals are not necessarily accessible to a broad readership (including indigenous and community-based practitioners in rural settings). However, John Heron’s website – specifically its section on cooperative inquiry ([www.human-inquiry.com/doculist.htm](http://www.human-inquiry.com/doculist.htm)) lists a series of papers on the topic, including a short guide on cooperative inquiry ([www.human-inquiry.com/cishortg.htm](http://www.human-inquiry.com/cishortg.htm)).
detail, providing information on all the fundamental requirements that must be in place for a successful co-enquiry process to take shape, and a step-by-step guide for implementing the full co-enquiry research cycle. These two chapters provide the theoretical framing for co-enquiry.

The two subsequent chapters are dedicated to practical approaches to co-enquiry, which are steeped in the field experience of the authors of this manual and of other COMBIOSERVE colleagues. The third chapter provides case studies of co-enquiry research in the COMBIOSERVE field sites as well as short descriptions of other (non-co-enquiry) methodological innovations developed by COMBIOSERVE research institutions. The fourth is a practical chapter presenting 6 Community Research and Co-enquiry Protocols (CRPs) for implementing co-enquiry research – 4 on the topic of biodiversity monitoring and 2 on the topic of socio-ecological change. They were prepared in the context of COMBIOSERVE, which seeks to ‘assess the effectiveness of community-based management strategies for biocultural diversity conservation’, but they are relevant for a wide variety of co-enquiry research objectives.

In the fifth chapter, we present practical guidance for implementing co-enquiry monitoring and evaluation processes, including a section on how to ensure community researcher wellbeing throughout the process. The manual then describes practical approaches for co-enquiry dissemination. It concludes with a brief overview of the relationship between co-enquiry and advocacy.

Some practical notes for the reader
Given that co-enquiry is a process, and as such can be improved by participants throughout its arc of implementation, the authors expect that the methods and approaches herein will benefit from lessons learned and experiences gained in the future. The manual is therefore intended as a living document, to be adapted and improved through practice and experience.

Throughout the document, readers will find different coloured boxes providing additional information on certain aspects of the work. Orange-coloured boxes are entitled ‘Voices from the communities’, and contain perspectives and quotes from community-based researchers on the topic at hand. Green boxes represent ‘Experiences from the field’ and contain brief analyses of real events that occurred in the COMBIOSERVE fieldsites. Turquoise-coloured boxes are ‘Ideas’ boxes, where we provide additional ideas relating to the topic under discussion. Dark blue boxes are ‘Comment’ boxes in which we provide an additional opinion or comment on the topic under discussion.
II. Co-enquiry in theory

The roots of co-enquiry: participatory research, action research, and community-based participatory research

In the last three decades participation has become an essential element for the transformation of modes of intervention in indigenous and local communities, particularly in the context of development and conservation, and particularly in many developing countries where there are significant power differentials between the external (often foreign) researcher and the local 'researched' population. In the intervening years, participatory research theories and practices have been revised, adapted, critiqued, improved and variously debated to great extent (Hall 1975, 1981, 1992; Fals Borda and Rahman 1991; Vio Grossi, 1988; Gudynas and Evia 1991; Israel et al 1998; Ander-Egg, 2003; Gonsalves et al, 2005, Cooke and Kothari 2001, Hickey and Mohan 2004).3

The values and ideas inherent to the concept of Action Research are also highly relevant to co-enquiry. According to Reason and Bradbury, action research is:

“…a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities.” (Reason and Bradbury, 2001:1)

In brief, action research – which is also known as participatory action research – is a grounded, participatory approach that takes as its priority the production of practical knowledge for resolving people’s problems (Wallerstein and Duran 2003). While co-enquiry may not always be solution-oriented, practitioners of co-enquiry agree that for the approach to be fully internally coherent it must respond to community needs, which are very often targeted at resolving problems. In this sense, the values of action research also belong to the co-enquiry framework.

The other core value of action research – that it embraces different ways of knowing in order to enhance collective knowledge – is mutual learning, or the importance of humility, openness, and overcoming epistemological barriers that see one way of knowing as better than another. The concept of mutual learning is the natural partner of co-enquiry, as it underscores the importance of equality in the learning process and learning outcome, while also pointing towards the win-win consequences of adopting a research approach that enhances the potential for learning amongst all partners. Co-enquiry’s potential for innovation, depth and reliability of research outcomes is manifest in the process of mutual learning.

3 The concept of participation can be mobilised and implemented in a many different ways in the research context: from least participation to community control over the research process (see Annex 3).
In its most progressive form, PAR has become commonly known as Community-Based Participatory Research (CBPR), an approach that establishes community members and researchers as equal partners – in terms of sharing power, resources, credit, results, etc. – in the research process and that seeks expressly to focus on issues of concern for communities rather than on the production of knowledge for the sake of it (ibid.).

In a community context, co-enquiry (also known as co-inquiry or cooperative enquiry) is similar to CBPR; yet the authors of the COMBIOSE manual prefer the term 'co-enquiry' because (a) it synthesises the concept of equality between research partners in the “co−” prefix and (b) replaces the narrower concept of research with the broader one of ‘enquiry’, opening up the process to embrace epistemologies, including modes of investigation, that do not necessarily follow mainstream research structures. It also overcomes some of the limitations that the terms ‘community’, ‘participation’ and ‘research’ implicitly contain.

Comment: What are we talking about when we talk about ‘community’?

The term ‘community’ is a useful shorthand for describing a group of people who share a living space, a territory, kinship ties, a local economy, and so on. Yet, time and again, the term has been used in a way that does not reflect the reality of ‘communities’ as they are, all over the world. Anyone who has spent time in any form of community knows that they are not homogeneous, harmonious, and bounded. Communities are, on the contrary, characterised by internal differences in wealth, status, wellbeing, and power; by fluidity and porous boundaries; and by internal conflict (see Agrawal and Gibson 1999, 2001), key references on the dangers of deploying the concept of community without examination). Furthermore, what constitutes ‘community’ can change quite rapidly over time, depending on “what is at stake in the moment” (Fortmann et al 2008: 250). Community members aspirations are also different – often competing and conflicting: what we understand as ‘community goals’ depend on which goals are taking precedence at the particular moment of engagement with researchers.

Despite these issues, it is commonly accepted that the term ‘community’ is more useful than not, and it is widely used when discussing co-enquiry. One of the principal reasons for continuing to use the term and concept is that local people often use the term to describe their social setting. In the experience of the authors of this COMBIOSE manual, Chinantecos have a very clear understanding of what their ‘communities’ are, who the members of those communities are and how they function. The most important rule for external researchers is to respect and use the terminology and concepts given by the local groups they are working with.

Having said this, external and community researchers must remain mindful of the complex and contradictory realities of ‘community’ life throughout the research process. This will enrich the co-enquiry process and research results. Community researchers can also be encouraged to reflect on the complexities of their ‘community’ through participant observation, a method described on p.33 in Chapter V.

State-of-the-art and innovations in co-enquiry

The concept of co-enquiry has a long history, particularly in British academic circles dealing with epistemology and action research. Leaders in the field of the co-enquiry approach are John Heron and Peter Reason, who have, since the late 1970s, published
extensively on the topic. The present document is intended as a hands-on manual for the implementation of co-enquiry, so rather than engage in a full literature review, we encourage readers to explore the bibliography (in which we include Heron and Reason’s key texts) and resources pages.

Throughout the 1990s, a number of textbooks and guides on cooperative inquiry have been published on cooperative inquiry, principally John Heron’s (1996) *Cooperative Inquiry: research into the human condition* and Peter Reason’s (1988) *Human Inquiry in Action* and (1994) *Participation in Human Inquiry*. These textbooks provide comprehensive accounts of the cooperative inquiry method, including the theoretical framework, philosophical underpinnings and guidance on implementing the method. However, their drawback is that they are not accessible to a broad readership, nor can they be used as a hands-on field manual. While Heron, Reason and other’s approaches to co-enquiry are laudably rooted in robust philosophical reflection and analysis, we perceive that the language and style used in the available literature may be far removed from the possibilities of practical application of co-enquiry in the field. There exists one practical toolkit for doing co-enquiry, produced by the Beacon North East initiative (Beacon North East 2012). As an 8-page brochure that contains key concepts and tips for implementing co-enquiry (from the position of the institution), it provides basic information and tips for the implementation of the process (see Ideas boxes p.14 and 31)
Ideas: Key elements of a co-enquiry approach (adapted from the Beacons North East Co-enquiry Toolkit (Beacon North East 2012):

**Cooperation and collaboration.** Although the concept of working *with* rather than *on* people is simple, in practice a lot of (participatory) research that is supposedly carried out *with* people still results in outcomes that are *on* people. The principle of full cooperation must be a constant, from the first steps of research design, to the dissemination of collaboratively produced results.

**Participation.** Philosophically, this means that all aspects of human life are interconnected and that every person has an important role in the research process. Practically, it means that every member of the research process (including community members) has a voice and an active input in planning, implementation, write-up and dissemination of the research.

**Equality.** This contains the principle of mutual respect: every member of the research process has equal right to a voice and a vote in decision-making, every viewpoint is valid and listened to, and decisions are reached consensually.

**Co-production.** New research knowledge is co-produced; no form of knowing (e.g. academic or expert knowledge) is privileged over another (e.g. experiential or traditional knowledge), as they are all considered equally valid.

**Social Justice.** The research has social justice outcomes: it has a positive, transformative impact on community life and aims towards community self-determination, empowerment, and autonomy.

**Political engagement.** Researchers are politically engaged in the issues faced by the communities they work with and committed to supporting their struggles. Any collaborative research is likely to engage with a number of different political struggles; while these are likely to render research more complex, they should be embraced by researchers as fundamental elements of the co-enquiry process.

**Ethics.** All aspects and stages of the co-enquiry process are rigorously assessed according to the highest ethical standards (see Annexes 1 and 2).

**Trust.** This is a key component of the co-enquiry relationship. Trust is fomented through full disclosure of project information, through explicit commitment (political, social, intellectual, emotional) on the part of researchers and communities, and through maintaining open lines of communication.

**Time.** Community decision-making processes often require significant time; community members are also keen to respect to specific calendars – agricultural, cultural, political, economic, educational, ritual, etc. – that mark daily life. Power imbalances between communities and researchers are most obvious when university or donor-controlled research schedules take precedence over community needs. Respecting community timetables foments trust, underlines community control over the research process, and permits indigenous philosophies and innovations to emerge.

**Mutual Learning.** As collaboration progresses, researchers and community members will ‘get better’ at doing co-enquiry and at learning from each other. Being mindful of lessons learned and teaching experiences as they are happening is an essential component in the personal and collective growth of those engaged in co-enquiry.
Co-enquiry and academic research

While co-enquiry continues to generate a great deal of academic and practitioner interest and discussion, they remain complex aspirations that are sometimes difficult to justify or implement fully in university settings. Within an increasingly commoditised, competitive and audited Academia, researchers find themselves bound to ‘rules of the game’ that are often rather incompatible with participatory research (see Hall 2005), let alone the deeply collaborative approach to research we are calling co-enquiry. The constraints on academics include the pressure to publish according to strict regimens of impact factor and authorship order, time pressures, job insecurity, and funding shortfall to name a few. These constraints tend to reduce the ability and desire of researchers to engage in innovative and partnerships with non-academic partners. It is important to note that there are many academics pursuing co-enquiry approaches, and many departments and institutions welcoming these progressive approaches, yet these are often academics and departments that do not receive deserved recognition because they remain underrepresented in formal academic literature.

In the face of these complexities, we wish to re-propose – and substantiate – arguments that have been made by other proponents of co-enquiry: that not only is it more fair and just to adopt a co-enquiry approach when carrying out academic research with communities – particularly on people-centred topics such as community-based management strategies for conservation – but it has the potential to improve the validity, quality and relevance of research (Brydon-Miller et al. 2003; Gall et al. 2009; Vaillancourt 2005). The remaining hurdle in the move towards handing the reins of research to community hands is one of institutional will rather than one of methodological frailty. In proposing a holistic alternative to conventional academic practices, co-enquiry challenges received wisdom regarding what constitutes successful research and the competitiveness of results obtained.

Finally, for co-enquiry to be successful, integrity and intention are as important as a willingness to engage in co-enquiry actions, a desire to improve the participation or a wish to enhance academic results. In other words, researchers must be deeply committed to the process of transformation – towards self-determination, empowerment, and full community control of the research process – that co-enquiry foments.

Basic differences between ‘conventional’ research and co-enquiry
In this chapter we describe the key differences between conventional research and co-enquiry research processes. The most important difference between conventional research and co-enquiry lies in the location of power in the research process. Although communities may be invited to collaborate and even participate in conventional research programmes, ultimately the researchers control the process. In co-enquiry, communities are the ones in control of the research process, and have the power to start, stop, and modify the process as they wish. Communities call upon researchers to respond to community needs, not the other way around. Co-enquiry, in this sense, goes further than participatory research as the balance of power is squarely with the communities rather than shared between communities and researchers.
Another fundamental difference lies in the objectives of the research. Conventional research has a number of different objectives – to create new knowledge for the wider academic and lay community, to publish, etc. – of which one may be, in some cases, to benefit the communities research institutions work with. Co-enquiry research has as its main and most important objective to benefit the communities involved in the research process, and, arguably, the emancipation of the communities involved (see Chapter VIII).

A central objective of co-enquiry and many other participatory research approaches is to build, through the research process, community capacity to respond autonomously to current and future problems. In cases that conventional research processes provide support to community capacity-building, these are not central elements of the research process nor do they generally result in communities feeling they have the ability to autonomously lead future research processes.

As mentioned, the entire research cycle of co-enquiry is adapted to be controlled by community researchers and community members. At the end of the research cycle, once data has been produced, in the co-enquiry framework, the communities own the data and decide what to do with it. In this sense, co-enquiry also fundamentally differs from participatory research in which the data is controlled in partnership by both researchers and communities, or conventional research, in which the researcher alone controls the data. It may be that co-enquiry research processes do not result in publications or further dissemination, if the community does not wish it, because in a co-enquiry setting communities are in control of how research results are disseminated (see Chapter VII).

Co-enquiry is a tool of the anti-oppressive research methodologies toolbox: it seriously engages with radically different ontologies and epistemologies and can profoundly challenge conventional academic approaches (see Ideas box below, p. 17-18). In the view of the authors of this manual, when carrying out research with communities, particularly historically marginalised/oppressed communities, co-enquiry should always be the preferred approach.
Ideas: Anti-oppressive, Critical and Indigenous Research Methodologies

Leslie Brown and Susan Strega (2005) coined the term ‘anti-oppressive research’ as a way of discussing a series of methodologies, including critical social theory, feminist approaches, emancipatory research in the line of Paulo Freire (see below) and indigenous methodologies, that challenge positivist social science. These can be considered ‘transgressive’ research approaches as they consistently challenge the inherent power dynamics of conventional academic research. In their search for ways of addressing these unequal power relations, anti-oppressive approaches generate unorthodox theoretical and methodological solutions.

Over the past 20 years, there has been a growing movement to rethink, radicalise and decolonise research processes. If this methods manual covers the co-enquiry stream of this movement, in this box we briefly survey the ‘anti-oppressive’ stream (see bibliography for an overview: Brown and Strega 2005, Ristock and Pennell 1996, Smith 1999, Denzin, Lincoln and Smith 2008, Mihesuah and Wilson 2004, Mertens 2009, Chilisa 2012).

These approaches tackle the very epistemological foundations of conventional research. Building on postmodern and poststructuralist exposés of how most scientific knowledge is produced, organised and circulated according to White, male, Enlightenment-based paradigms, anti-oppressive research “takes seriously and seeks to trouble the connections between how knowledge is created, what knowledge is produced, and who is entitled to engage in these processes” (Brown and Strega 2005: 7). It cracks open the black box of what constitutes ‘legitimate’ knowledge and research, by proposing that diverse forms of knowing are legitimate and deserve space in academic research, and by making explicit the political practices of creating knowledge. Researchers operating in this model are required to question and challenge how their position, history, location, race, culture, gender, and so on shape their worldviews and research ideas. They are required to make a commitment to those they work with, personally and professionally, with a view to making empowerment, emancipation, social justice and resistance central aspects of the process and outcome of research (Potts and Brown 2005: 260).

This challenge is highly politically charged, given that most universities and research centres still operate from the premise that the classic research model is impartial, objective, “innocent in intention and effect”, race- and gender-blind and apolitical, and is the only way to achieve the truth. Knowledge gained by researchers who locate themselves politically and socially is considered inadequate, or of a lower status, in these contexts, as self-reflexivity implies identifying emotions, personal self-interest, political values and cultural codes – all of which threaten academia’s ability to produce truth claims (Brown and Strega 2005).

An integral part of anti-oppressive approaches are what are known as ‘critical indigenous methodologies’, which provide for both indigenous and non-indigenous researchers the opportunity to carry out research from within a radically different framework, leading to results that innovate, create and inspire new solutions to questions posed. Increasing numbers of indigenous scholars are contributing to the development of a critical indigenous research (Wilson 2008; Cochran et al 2008; Dezin, Lincoln, Tuhuwai Smith 2008; Hart 2010; Kovach 2010; Chilisa 2012). Weber-Pillwax (1999) provides as succinct set of principles that frame indigenous methodologies: (a) the interconnectedness of all living things, (b) the impact of motives and intentions on person and community, (c) the foundation of research as lived indigenous experience, (d) the groundedness of theories in indigenous epistemology, (e) the transformative nature of research, (f) the sacredness and responsibility of maintaining personal and community integrity, and (g) the recognition of languages and cultures as living processes.
Cree scholar Shawn Wilson (2001, 2003, 2008) has consciously developed an indigenous research paradigm, which he presents in his books *Research as Ceremony* (2008) using in conjunction an academic-style text and a story-telling-style text, generating with the reader the type of relationality that epitomises indigenous research approaches. Wilson (2008), followed by Hart (2010) and Kovach (2010), have developed an indigenous theory, practice and methods – rooted firmly in indigenous ontology, epistemology, methodology and axiology – that seek to exit the tired binary comparison with Western thought.

Being rooted in indigenous ontologies and epistemologies, critical indigenous research can resist the pressure to be academised, institutionalised or otherwise sanitized for appropriation by conventional research discourse and practice. This has been the case with once-radical research approaches like Participatory Action Research, which has been sometimes been co-opted by the mainstream, and in the process de-politicised, neutered, and in some cases, rendered part of the toolbox of subjection (see the Ethical Issues chapter p28-30 and, as an example of the literature on this topic, the classic collection edited by Cooke and Kothari 2001). Maintaining the spiritual and sacred roots of indigenous research as the foundation of the approach helps to ensure that it will not be ‘disciplined’ for institutional purposes (Garoutte 2003).

The beauty of the critical indigenous methodological approach, as well as other anti-oppressive approaches, is that they can be mobilized by academics of all genders, races, backgrounds, orientations, etc. so long as the researchers are willing to do the work, ask the questions, challenge themselves emotionally and intellectually, and stand up for social justice in the face of multiple institutional pressures. As Potts and Brown (2005: 283) conclude:

> “Always being reflective about yourself and your work is not easy. Just when we think we’re getting it right, we realize we’re only getting it better. Becoming anti-oppressive is not a comfortable place to be. It means constantly reflecting on how one is being constructed and how one is constructing one’s world.”

Yet, increasingly, it is precisely this complex challenge that makes adopting an anti-oppressive methodological approach so inviting to researchers working with indigenous and other marginalised communities.

On the other hand, some researchers may argue that for research to be objective and valid, there are cases in which it is more appropriate to carry out research that follows a more conventional approach, i.e. that outside experts are required to implement it. This is argued in particular for research that touches on topics that community members might not feel comfortable talking about with community peers, for issues of confidentiality. In our view, if the communities are not able to carry out the research themselves, then it is probably not as relevant to them as research they are able to implement. Furthermore, in many cases, it is likely that community members feel more comfortable speaking openly with a community group rather than with external researchers carrying out conventional research.

However, there may be cases in which a community feels that conventional research processes would better suit their needs. It is important that such a position be respected, as communities must be empowered to make their own decisions about what kind of research approach they wish to take, and for what research outcomes. Such a decision must be made with the full knowledge of the diversity of options available to them along
the spectrum of research approaches, which goes from strictly conventional to co-enquiry, and the implications of each option.

The co-creation of sciences

Some of the most important differences between conventional and co-enquiry research processes are rooted in the fundamental ontological, epistemological and value differences between conventional science and the endogenous science of indigenous peoples or rural communities. In a recent and innovative publication *Towards the Co-creation of Sciences*, Haverkort et al (2013a) have sought to demonstrate, through case studies, the possible approaches to co-produce knowledge and science through a transdisciplinary approach. Their fundamental argument is that it is possible and necessary to envision the complementarity of conventional and endogenous science and to work towards co-creation of sciences through open dialogue and mutual learning.

Their basic definition of science provides the ground for equality between different epistemological systems:

“Science is a body of knowledge formulated within a specific worldview and value system and classified under a theoretical framework. It includes the processes for producing, storing and retrieving knowledge, formulating assumptions, general principles, theories and methodologies, and it involves the active role of a specific knowledge community that has reached consensus on the validity of these processes. The knowledge acquired and the resulting science is always limited and subject to modification in the light of new information and insights.” (Haverkort et al 2013: 13).

Given this basic definition of science, they make a series of propositions that make inter-science dialogue and the co-creation of sciences possible (Haverkort et al 2013b: 42). The first is that none of the sciences can “claim absolute truth or scientific certainty” as each science has strengths and weaknesses. All sciences are built on a number of essential factors: worldviews (ontology), ways of learning, theories and knowledge concepts (epistemology), and values; all sciences are equivalent. Secondly, given the great differences in worldviews, methods and values, it is impossible “to use the parameters and criteria of one science to assess or falsify another science”. Thirdly, each science can be enhanced and explore new paradigms through intra-science and inter-science dialogues. Finally, they consider the plurality of sciences and asset for cultural and scientific sustainability and for addressing current world problems (see also Ideas box on Anti-oppressive, Critical and Indigenous Methodologies, below).

Such premises open up the possibilities for the co-creation of sciences and co-enquiry in new and empowering ways for communities. This approach highlights the importance of self-reflexively examining one’s worldviews and values prior to engaging in a co-enquiry process, as these fundamentally influence how participants engage with the process. This is true for community members and researchers alike. Only when values and worldviews are explicit, and each participant is fully aware of the impact of their cultural baggage on the co-enquiry process, can the work of bridging differences in worldviews and values begin.
IIII. Co-enquiry in practice

Although much has been written about co-enquiry, it is still not a commonly used practice in the context of research on community-based management of biocultural diversity, partly because of a lack of widespread understanding of how to implement it. A valid reason for this lack of clear how-to information is that inherent to the concept of co-enquiry are the basic rules that (1) every social situation is different, requiring tailored co-enquiry approaches, and (2) every co-enquiry process will be developed individually by the group of participants involved and cannot be affixed to pre-established procedures. While we fully agree with the foundational philosophy of in-built flexibility, we suggest that one of the main reasons co-enquiry is not yet widely used in research situations where it would be ideal—for example, when studying community-based natural resource management—may be because of a lack of guidance and methodological support for willing researchers.

As a contribution to the growing movement towards decolonising research and empowering communities to control their own research agendas and outcomes, we propose this manual, which provides practical guidance, tools and ideas aimed at encouraging researchers, communities and other actors to engage in these progressive approaches and turn self-determination into a central objective in the research process. In red, we pose common questions that facilitators might have when engaging in these processes for the first time. These questions are then answered with suggestions that have emerged from GDF’s field-based experience in the Chinantla fieldsite (see the Introduction for some context on GDF’s fieldwork in this site).

The conditions for co-enquiry

In this section we describe some of the key elements of for ethical engagement with communities (see also the section on Ethics below, as well as Annexes 1 and 2), including the importance of rigorous and continuous ‘checking-in’ with partner communities to ensure that the co-enquiry process remains empowering and acceptable to all.

Free Prior and Informed Consent

A foundational principle for anyone working with indigenous or local communities is the respect for their collective right to Free, Prior and Informed Consent (FPIC), which is recognised in many nations’ laws as well as in important international legal instruments. FPIC is both a right whereby communities are able to give or withhold their permission for activities to take place within their community or on their territory. It therefore constitutes their right to choose and to make autonomous decisions regarding issues that affect them. FPIC is also an inherent element of indigenous and local communities’

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4 The principal international instruments that explicitly recognise indigenous communities’ rights to FPIC are: the United Nations Declaration on the Rights of Indigenous Peoples (2007), ILO Convention 169 (1989), General Recommendation XXIII of the United Nations Committee for the Elimination of Racial Discrimination (CERD), Decisions from the Conference of the Parties of the Convention on Biological Diversity (CBD), the Interamerican Commission for Human Rights, as well as numerous multilateral institutions, banks, funding agencies, etc.
rights to self-determination (the right to determine their own futures), and as such is a tool for community empowerment and for protection of their territories, resources and lives.

Consent signifies that the community agrees to a given plan, which may have been reworked by the community in order to respect its members’ aspirations. Consent is only considered acceptable if all community members have been consulted, according to processes that respect community governance procedures and have been led by the community members themselves. In many cases, the final decision made respects processes of consensus decision-making. Consent is considered valid only if all of the problems raised surrounding the plan have been fully addressed and acceptably dealt with. Moreover, the application of FPIC requires any consent made by the community to be:

- **Free**: this means that it is free of pressure, manipulation, intimidation or coercion; communities are allowed to take the time they need, follow their own procedures, use their own language, and implement their own norms to carry out the process.
- **Prior**: the decision-making process necessarily must take place prior to the launch of the activity, and ample time must be given for the community to make a concerted decision.
- **Informed**: all community members must receive full information of all aspects of the proposed plan (information can *not* be withheld), and outside actors should be ready to disclose and produce any item of information that the community might need to make the decision.

The process of engaging with a community must respect these four elements integrally; the right to FPIC must be fully, mindfully and conscientiously implemented. For example if the community withholds consent, or demands that the plan be amended in order to give their consent, it is imperative that this wish is respected – *regardless of the consequences for the outside actor* (e.g. in the case that donors may retain funding for this actor if the research or intervention does not go to plan).

The practical application of this right is more complex than at first glance. It does not simply require outside actors to ask the community whether they accept an intervention or not: it involves a series of unequivocal steps and a constant mindfulness, on the part of outside actors, of community members’ feelings regarding an accepted intervention. Effectively, FPIC is as much a *process* as a right, with far-reaching implications. As a decision-making process, FPIC is iterative: it starts with community consent and then continues throughout the implementation of the project, until the moment of its conclusion.

The overall procedure for the FPIC process will depend on local norms and practices for community decision-making. Below are a few recommendations to help outside actors as they engage in this process with communities:

1. **Initial meetings**
At the start of the FPIC process, it is recommended that researchers carry out information meetings with community authorities or decision-making bodies (the authors recommend this process be carried out with the community assembly). During these meetings all available information on the project is shared, for the community members to reflect on and deliberate on according to their own processes, which may often mean absent the external researchers.

2. Information-sharing
The information to be shared – both orally and in written form – must include:

- The project and/or research aims and objectives;
- The proposed project time frame (although in practice the project will be re-scheduled according to community needs once it has started);
- Details of the activities proposed, including where they may take place and whom they may involve;
- The decision-making processes proposed within a co-enquiry framework;
- Presentation of the facilitation team;
- Reasonably predictable consequences or outcomes of the proposed project (including benefits and/or disadvantages for the community);
- Potential predictable risks that may emerge and how they would be addressed.

All of this information must be given in a language and format that is easily understandable for the community. It is important that the full technical proposal be shared with the community (with the caveat that within a co-enquiry scenario these are subject to change depending on community decisions). However, it is also important that community members can easily understand these documents, so they should be, if necessary, translated and/or simplified (without omitting important elements) in order to be fully understandable. Ideally, the process of sharing information would be part of a broader mutual learning process, where intercultural and bilingual tools are used to ensure full understanding by all actors present. It is recommended that those presenting this information to the community be trusted individuals, so that community members are able to freely express their doubts, objections, opinions, questions and proposals.

3. Decision-making
Once the information has been fully shared, the community is given time to make their decision, using their own customary mechanisms for decision-making. It is important that all members of the community have a say in the final decision. If the facilitators suspect that elites or community authorities are making decisions against the will of other community members, it is highly recommended to reflect on whether that particular community is appropriate for the implementation of co-enquiry approaches, which require a strong participatory spirit. During this stage, the community is also called upon to request or suggest changes and improvements to the proposed activities, sites, risks, and use of results among others (although it is important to note that they will be able to continue to do so throughout the research project). Community processes for celebrating an agreement are to be respected.

4. Collaboration agreement
Some communities may require a collaboration agreement, which contains in writing all of the important elements of the relationship between the outside actors and the community, including any restrictions the community wishes to place on the scope or activities of the project, and any expectations community members have regarding reciprocity, research processes, authorship, and so on.

5. The ongoing FPIC process
The FPIC process continues throughout the project cycle; this means that every decision, change or innovation made within the project context has to be consented upon by the community following the above procedure. Project facilitators should also regularly and actively ‘check in’ with community members regarding project progress in order to ensure that any emerging query, problem or shortcoming is dealt with appropriately.

Similarly to other ethical good practices that are mainstreamed into research approaches, FPIC suffers from the potential of becoming institutionalized, of being treated as a box-ticking exercise. It is fundamental that FPIC be applied mindfully, and with the intention of ensuring the communities involved are fully allowed to give or withhold their consent for any aspect of the research process. The principles described above have been given a great deal of thought by indigenous intellectuals, community activists and ethically-oriented policy-makers. When applied thoroughly and with integrity, they provide an excellent foundation for ethical engagement with communities in co-enquiry research processes.

**Experiences from the field: community-led decisions regarding research**

In one of the COMBIOSERVE fieldsites, halfway through the project, partner communities decided that they no longer wished to engage with some of the research methods they had originally agreed to. While the community was aware of this when they originally agreed to the research, based on their re-reading of these particular methods and a politically sensitive context, they decided to withdraw their agreement for these methods being implemented.

This caused some dismay in the consortium as the leaders of that particular research theme were obliged to change their approach and revise some of their objectives. However, given the spirit of co-enquiry and community empowerment underlying the project, following in-depth discussions between all parties the consortium agreed to fully respect the decision of the community. Although there remained concerns that the withdrawal of communities from this fieldsite from this specific element of the project would diminish the quality of the research outputs and perhaps jeopardise good relationships with the European Commission, this is an example of ethical good practice, and of researchers’ commitment to collaborative research.

**Engagement throughout the research process**

The principles of ethical engagement described in the above section on FPIC, in the Ethics section on p. 28-30 and in the Annexes are to be respected and applied throughout the research cycle. It is not sufficient to reflect on them during research planning or when establishing rapport with the community. To ensure ethics guide the entire process, the authors suggest that these principles and guidelines be referred to continuously throughout the research process. Another excellent way of ensuring that the research
continues to respect these principles is by organising regular 1-day workshops with partner communities in which key questions surrounding ethics are discussed as a group.

The following are examples of questions that can be used to launch participatory reflection (amongst others):

- Do community members still all agree with the research objectives?
- Are community members happy with the progress of the research?
- Are community members happy with the process of engagement with the research facilitators?
- Do community members feel comfortable with the manner and behaviour of the facilitation team?
- Are the facilitation team and the community members happy with communications?
- What would community members change in the research process to improve it?
- Are there any other needs community members would like the facilitators to address?
- Etc.

**Engagement beyond boundaries**

Engaging ethically with communities also requires researchers and other outside actors interested in working with communities to provide support to communities beyond the scope of the research project itself. In practice, as friendly, committed and regular visitors to the community, facilitators are very likely to be asked, amongst others, to support community initiatives, to search for information the community needs, or to engage politically with community struggles. Given that the co-enquiry approach is founded on social engagement and a political commitment to empowerment, researchers must mindfully respond to these requests – as long as fulfilling them upholds researcher respect for the ethical principles laid out in Annexes 1 and 2.

**Essentials: time, money and commitment**

It is essential that any researcher or institution wishing to embark on a co-enquiry process take into account two essential components of a successful co-enquiry project: available time and resources.

Co-enquiry requires a heavy contribution of researcher's time in fieldwork and in processes of engagement. In Chinantla fieldsite experience, in which 3 basic research processes were ongoing simultaneously (biodiversity monitoring, community mapping, and social science research) a 4/5 person facilitation team, available to travel monthly to partner communities for 4-10 days at a time over the course of 3 years, is a minimum requirement for providing the support necessary for the implementation of a proper co-enquiry process. These trips may not necessarily be solely for the purpose of the research at hand, however, as facilitators must also be available to support communities on other issues that arise (see the section Engagement beyond boundaries). Thus, when planning co-enquiry schedules, it is strongly recommended that the facilitation team allocate more time than required for each activity.
In order to fulfill these time requirements, it is essential that the facilitation team secure sufficient financial resources. These resources must cover the time and travel of the facilitation team, as well as a fund to support the time investment on the part of partner communities. GDF, the leader of the fieldwork supporting the production of this methods manual, makes a yearly lump sum available to partner communities. Through community decision-making mechanisms, the latter decide autonomously whether to pay the community researchers for their time, to save the fund for community emergencies, or to invest it in community development projects.

Beyond the basics of time, money and the necessary infrastructure to carry out research among communities, it is essential that researchers wishing to engage in co-enquiry are fully committed to the process, and intend to remain with the project throughout. Given the intense and reciprocal relationships that invariably develop between facilitators and community researchers, sudden changes can be highly disruptive, particularly if new facilitators are to be trained in co-enquiry approaches or have little experience working with the communities (or types of communities) involved in the research.

Given the necessary requirements of time, energy and commitment, it is highly recommended that first-time co-enquiry projects be implemented in the context of existing relationships between researchers and communities. If participants already know (and like!) each other, communication is likely to be more open, engagement processes more fluid, and trust easier to consolidate. Moreover, facilitators are likely to be more in touch with community concerns and research needs, meaning that funding proposals will be grounded and robust.

Experiences from the field: when community processes ‘get in the way’ of funded research schedules

As previously mentioned, much of the work described in this manual was carried out in collaboration with communities from the Chinantla region of Oaxaca, Mexico. Our fieldwork was set to begin following the signature of the community agreements in March of 2012. However, by August of that year, we still had not been able to fully launch our fieldwork. This is because although our partner communities wished to carry out the project, they were dealing with some important internal political re-organizing at the time, and were unable to dedicate the time and energy necessary to launching the fieldwork. This resulted in a significant delay – in relation to the schedule set out in the project documents – in the production of deliverables.

Given the funding body’s strict rules about conforming to project and output delivery schedules, we were concerned that this would constitute a major setback and may even jeopardise the project. Notwithstanding this potential outcome, we decided to follow ethical best practice: to ensure that the communities involved were the ones to decide when the fieldwork would begin, even if it resulted in the research team having to make up for lost time in the delivery of outputs, and in some cases produce them with some delay. In the event, the EC’s Technical Review of our project, carried out in October 2014, commended GDF for its good practice regarding allowing the communities to define their own timelines and schedules for project implementation. Such a positive outcome is not always the case, however, and it is very important that (particularly large-
Community conditions
Although we hope that co-enquiry will increasingly be mobilised in research processes with communities, if certain key community conditions are not in place, it may not always be possible. The first key condition is that communities wish to engage in co-enquiry and have expressed this wish to the researchers with whom they wish to work. In order for this to be the case, there has to be a certain degree of agreement within the community itself regarding the collective desire to carry out a co-enquiry research process. While we cannot expect everyone in the community to always fully agree with each other, it is essential that there is an overall consensus that this is important. Researchers can gauge this through dialogue and community meetings prior to beginning activities.

Another key requirement is that there are individuals within the community who wish and are able to take on the role of community researcher, as discussed further along in this chapter. Although it is not necessary that community researchers are formally educated, they have to be willing to examine their knowledge, pose questions, and reflect deeply on a variety of issues that affect their community. They must also be willing to try new technologies and engage in ideas and processes that are unfamiliar to them.

It is essential that the whole community have clarity on the relationships between researchers, community and community research team. It is also important that other external actors working in or with the community understand the co-enquiry process and its objectives, so as to avoid potential misunderstandings. It is also important that the co-enquiry research engage with other ongoing community-outsider processes with a view to having the different processes be mutually beneficial rather than mutually limiting. Co-enquiry can be hindered by conflicts between external actors, which can result in divisions being created within the community – an outcome that would be detrimental to the whole process. To gain this kind of clarity, regular, open and honest dialogue is necessary.

Challenges of co-enquiry
Co-enquiry processes do not come without inherent challenges. Some of these have been covered already, e.g. the challenge of ensuring enough time and financial resources are dedicated to ensuring a truly collaborative process and the challenge of carrying out co-enquiry in the context of academia. Another challenge that many facilitators are likely to encounter and related to FPIC (discussed above) is when communities decide that they would like to alter a previously agreed-upon aspect of the research, change research timetables, or stop the research altogether. This can sometimes cause serious problems for the external researchers, who are likely to have funding-related commitments to fulfill (see Experiences from the field box, p.25). External researchers are encouraged to

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3We further discuss this aspect of institutional funding in a COMBIOSERVE synthesis paper, to be published at the end of the project.
seriously consider all of the contingencies that may arise throughout the co-enquiry research process and include these in their funding proposals.

Beyond the practical challenges of co-enquiry, there are more conceptual challenges that collaborative research groups have to deal with. One of the most obvious ones is power inequalities both between the different groups within the co-enquiry process as well as within those groups (Pohl et al 2010). Without special attention to issues of power – and specifically the intention of ensuring that the different groups within the co-enquiry process are fundamentally equal within it – the process may be hijacked by one of the parties (the research partners, local elites, etc.). It is therefore important that power relations be examined and potential sources of conflict or inequality ironed out prior to the start of the project.

Another challenge the group might find is how to integrate the (sometimes) divergent interests, perspectives and approaches of the researchers, funders, and communities. In the context of co-enquiry, the community’s needs are paramount; nevertheless, researcher and funder requirements must be taken into account otherwise the co-enquiry process cannot progress. From the perspective of academia, it may seem that co-enquiry processes lack the rigour and objectivity required for high-quality research. From the perspective of communities, academic research often does not take community needs and rights as the starting point of their approach, resulting in research processes that may not stand up to the ethical approach now demanded by communities. From the perspective of funders, co-enquiry processes may not result in the outputs and objectives expected when the project was funded.

These different expectations are rooted in the different ontologies, epistemologies, and practices underlying each group’s worldview and their needs with regard to the research process itself. Integration of these different perspectives for the implementation of a project that is useful and acceptable to all involved is essential. In its strongest reading, integration “stands for consensus achieved regarding a problem, its causes and its sustainable solution” (Pohl et al 2010). In order for integration to take place, it is important that these differences are aired and accepted by the research team at the outset of the project. This can be done through open dialogue, and a collaborative search for solutions for bridging obvious differences between the groups. Integration is an iterative process throughout the project; it will regularly encounter challenges that must be examined and worked through in dialogue by the research group and the community as a whole.

Some research groups may encounter issues of trust and legitimacy. By establishing open dialogue around issues of power, integration of interests, and research objectives and process, researchers help to overcome some of the challenges they may encounter regarding community trust, access and their legitimacy as researchers. Most co-enquiry processes begin when a particular community or set of communities approaches researchers (or other external facilitators) for the implementation of a research process to resolve one or more community needs. In these cases, researcher legitimacy at least is present. Even if there is a pre-existing mutual trust between researchers and communities, continuous effort is required on the part of all participants to ensure that it
is maintained. In the context of work with indigenous or rural communities, their long histories of oppression and marginalisation often results in trust being slower to build up and more fragile when present.

In the cases that researchers initiate a co-enquiry process themselves, gaining access, legitimacy and trust will be more complex. A great deal of researchers’ time will be necessary, as will openness to answer questions, engage in dialogue and change their objectives and/or approach if so requested by the communities. Beyond the basic challenges mentioned here – power, integration, trust, access and legitimacy – lie the core challenges which concern research ethics in the context of co-enquiry. These are examined next.

**Ethical issues**

Much has been written about the specific ethical issues arising within participatory research (see the Resources section on ethics at the end of the manual). Even though co-enquiry is implemented with the very intention of carrying out the most ethical possible form of research, it can suffer from the same setbacks as participatory research (see Comment box immediately below).

### Comment: Possible harmful effects of participatory methods and approaches [adapted from Armstrong and Banks (2011), compiled from other sources]

- Production of participants as subjects requiring research/development;
- Production of suitably disciplined subjects as participants expected to perform appropriately within participatory processes;
- Retention of researcher’s control whilst presenting themselves as facilitators of neutral or benevolent processes;
- Re-authorisation of researchers as experts in participatory approaches;
- Romanticisation or marginalisation of local knowledge produced through participatory processes;
- Reinforcement of pre-existing power hierarchies among participating communities;
- Legitimisation of elite local knowledge simply because it is produced through participatory processes.

Theoretically, taking a co-enquiry approach rather than a simply participatory approach obviates most of these possible negative consequences. Nevertheless, the danger of a ‘research-as-usual’ process being masked by a co-enquiry veneer exists, and when it occurs it can be even more damaging than sincere conventional research. If co-enquiry is not implemented mindfully, and with the most sincere intention of achieving empowerment and self-determination for the communities involved, it risks become a tool for oppression rather than one for liberation (Cooke and Kothari, 2001).

Unfortunately, it is also possible for ethical problems to arise even with the best of intentions and an utmost attention to ethical practice. This may be the case, for example, if a specific sub-group in the community (e.g. a local elite) takes over the co-enquiry process, in spite of the best efforts of the facilitator, resulting in increased inequality or oppression of other members of the community, and eventually, conflict. In such cases,
the cardinal rule of respect for internal community processes becomes more complex for researchers to follow, and questions of facilitator intervention may arise. While each case must be evaluated individually, is it often most advisable for facilitators to remove themselves from that community and put co-enquiry processes on hold until conflicts have been resolved internally. Further, there are ethical dilemmas that are inherent to co-enquiry (see Comment box immediately below) that are present no matter the integrity, mindfulness or ethical stringency of the research team.

<table>
<thead>
<tr>
<th>Comment: Ethical dilemmas in co-enquiry/participatory research [Manzo and Brightbill (2007:33), adapted from Armstrong and Banks (2011)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Participant anonymity cannot be guaranteed in community group work focused on local change;</td>
</tr>
<tr>
<td>• Giving participants a voice risks revealing their survival strategies to those who oppress them;</td>
</tr>
<tr>
<td>• Projects can engage ordinary people in potentially controversial action;</td>
</tr>
<tr>
<td>• Shared control over the research creates ethical conundrums that emerge throughout the process and are not easily predicted at the outset.</td>
</tr>
</tbody>
</table>

The Code of Ethics of the International Society for Ethnobiology (see Annex 2) and 15 Ethical Principles of the International Institute for Environment and Development (IIED) (see Annex 1) provide key guidance for the implementation of high ethical standards in research with communities. Co-enquiry processes seek to surpass these high standards, and in order to do so facilitators are called upon to pay attention to key characteristics for a radically ethical co-enquiry process (see Ideas box immediately below).
Ideas: Some key characteristics of an ethically sound co-enquiry process, adapted from Manzo and Brightbill (2007).

**Representation:** This goes beyond attempts to give ‘the other a voice’ and instead recognises the participant’s ability to represent themselves throughout the research process and to help direct the process. Practically it is helpful to clarify roles, responsibilities and decision-making on an ongoing and reiterative basis.

**Accountability:** Co-enquiry researchers are accountable first to community researchers and the communities in which they work, and second to the institution within which they’re embedded. In this way, the habitual interpretation of accountability is broadened.

**Social responsiveness:** Because participatory research is collaborative and change orientated, the researchers have to be responsive to the needs and perspectives of participants. This can result in a fluid and changeable research process. This can pose problems with institutions or funders if they expect predictable, time-bound, and complete results. The choice to engage in co-enquiry is radical, and requires flexibility and lateral thinking on the part of funders and institutions as well as the research team. For co-enquiry to be successful, these conditions should be clear at the outset of the project.

**Agency:** Co-enquiry broadens the ethical principle of respect for persons because every person involved must accept the responsibility of recognising that each of their peers has a right to a voice and a valuable contribution to make. Agency belongs to all research participants, and therefore ethical behaviour is required from facilitators and community researchers alike.

**Reflexivity:** Ethical dilemmas are often seen as something to be predicted and anticipated in advance. However, in co-enquiry research the ethical dilemmas are best understood in a process-orientated way. Co-enquiry research is flexible, socially responsive and emergent so questions and issues that require ethical decisions may only materialise during the collaborative process. Thus, facilitators and community researchers should schedule an ongoing ethical review of their own project throughout the research process.

### Doing co-enquiry

In this section we provide guidance on implementing the process of co-enquiry in a community setting.

**The conventional research cycle**

The following is a summary of the conventional research cycle:

1. Determining the knowledge gap or need
2. Developing research questions to address that gap
3. Planning a process for answering those research questions, including development of an appropriate methodology
4. Gathering data using the methodology devised
5. Sorting, sifting and analysing the data gathered
6. Synthesising the analysis
7. Evaluating the analysis in relation to the original knowledge gap and questions
8. Reporting on the process and results, usually an activity that generates further questions, launching a new phase of the research cycle.
**Ideas: Basic skills required for researchers to engage in co-enquiry.**  
(Adapted from the Beacon North East Co-enquiry Toolkit 2012)

### Generic skills

**Adaptability.** Researchers must be flexible and cope well with unexpected changes and events; they must build adaptability into their research philosophies and programmes.

**Ability to think laterally.** Researchers must think about research questions or problems from a variety of perspectives and be willing to think laterally, innovate and search for compromises that enhance collaboration.

**Communication skills.** Researchers must be able to communicate clearly and respectfully with a variety of individuals and groups from diverse cultures and backgrounds. They must be good at bridging communication gaps and at explaining complex ideas using jargon-free and simple language. They must be excellent listeners.

**Ability to manage and meet expectations.** This is particularly relevant for those researchers who are reporting to a University or a funding agency. Researchers must establish clear aims and objectives – with full explanations of the flexibility needed for co-enquiry processes – so that when research plans evolve and change within partner communities (and they will!) the researcher can continue to respect the principles of ethical community engagement while also responding to institutional requirements.

**Ability to manage group dynamics and processes.** This is essential for researchers who will be required to facilitate community processes of reflection and the research processes led by research teams. For those who have not had extensive experience managing group dynamics, it is recommended that they take a course.

**Mindfulness.** This is one of the core principles of the ISE Code of Ethics (Annex 2) and it bears repeating here. In Buddhist thought, from which the concept borrows, being mindful implies full awareness of reality, for which it is necessary to be in the present moment, and which allows clarity of comprehension and wisdom to arise. In the context of research ethics, being mindful implies remaining continuously aware of the consequences of one’s choices, conscious the ethical implications of one’s behaviour, and attentive to the bigger picture. Connected to mindfulness is the concept of non-attachment, by which participants should be wary of investing their identity or emotional security in certain outcomes or structures all the while remaining committed to the process (Heron and Reason 2000).

### Specific skills

- Ability to assess commonalities and differences in values and interests.
- Ability to mediate peacefully and diplomatically in conflict situations.
- Ability to maintain friendly, patient, empathetic and approachable persona.
- Ability to rapidly recognise and propose workable solutions when challenges emerge.
- Ability to recognise and deal with emotional responses such as distress, anger.
- Ability to deal mindfully with chaos, while recognising that chaos can also be a productive moment in the process of innovation and reflection, and must be kept in tension with order.
- Ability to encourage the involvement of people who tend to be more passive or quiet, while diplomacy dealing with characters that may be more overbearing or aggressive.
- Ability to negotiate institutional research ethics procedures and to work with the unique ethical challenges that can arise in co-enquiry.
- Ability to learn rapidly in challenging social situations and to implement learning-based changes in approach.
The co-enquiry research cycle

The co-enquiry research cycle follows a similar path to the conventional research cycle: problem > questions > methods > collection > analysis > synthesis. What is different is the context: in co-enquiry the research cycle is guided by local timetables, political structures, preferences, processes of dialogue, forms of collaboration, methods used and epistemological frameworks. It is also mostly aimed at solving a problem and therefore concludes with a practical outcome. In this section, we describe a co-enquiry approach for stage of the research cycle.

Role of research facilitators

Most co-enquiry processes start when a community, or group of communities, approach outside researchers for support in resolving a problem or satisfying a research need that has been determined by the community. The research process itself is controlled and actively led by the community, usually by an elected team of community researchers. Outside researchers become research facilitators in co-enquiry frameworks: their role is to provide training, guidance and financial support for the co-enquiry process.

Voices from the communities: the need for facilitators’ support

Some readers may wonder whether a team of facilitators is always necessary, especially once community research teams have been trained. This was a question asked of the community researchers during the Community Researcher Dialogue of the COMBIOSERVE Conference Community Conservation in Latin America: innovations in research and practice, held in Xico, Veracruz, Mexico, 6-9 November 2014. The community researchers present all answered in the affirmative: having facilitators accompany them throughout the process was essential. They mentioned in particular the academic element: receiving support to ‘formalise’ their knowledge and lay it out for publication or present it using video. It is important, they underlined, that these external researchers be there to truly help the communities (and not to help themselves) and that they build and maintain a strong relationship of trust.

Good research facilitation requires a basic understanding of social science methods, including ethnographic approaches – such as participant observation – as these allow the facilitator to remain highly attuned to ongoing social processes and act appropriately when issues arise. Keeping diaries and notes of what people have said, how they’ve related to each other (and to the facilitator), and how social situations have been dealt with are important tools for ensuring a constant assessment and improvement of research facilitation. These notes and observations can also be used in reports for the dissemination of analyses of the co-enquiry experience.

While implementing co-enquiry processes, facilitators must strike a fine balance. Although theoretically the communities control the research process, in practice they rely on facilitators for a great deal of support in explaining and choosing methodologies, implementing trainings, and orienting the process. This dependence can make the facilitators’ task complex, as they have to be very careful not to take advantage of the power conferred on them, to be mindful of the importance of autonomy, and simultaneously respond to communities’ requests for support and advice. It may be particularly difficult for facilitators to be neutral about implementing methodological approaches that they feel are inappropriate or unethical, resulting in co-enquiry processes that give priority to the facilitators’ methodological preferences. Similarly, it may be that
facilitators will prefer to train community researchers in methods they feel comfortable with or think are appropriate in the circumstances, avoiding methods they are not familiar with.

Such choices are not necessarily negative: facilitators often have a great deal of experience working with communities, and therefore have a deep understanding of what works and what does not; it is also important for facilitators to work with methods they are at ease with, otherwise the outcome of the co-enquiry process, which relies on the personal ability, sensitivity and capacity to explain of the facilitators, could be compromised. However, it is important that a wide variety of methods are appraised for their co-enquiry potential, regardless of facilitators’ preferences, knowledge or personal opinions.

Comment: The basics of participant observation

Participant observation is the central method for ethnographic research, and it is a core component of the process during which researchers and communities get to know each other (see Barnard 2005 for an overview of the method). The principal tenet is that outsiders participate in everyday life while observing social and cultural practices. The process informs a deep, and often embodied, understanding of cultural norms and social processes, which helps tonify relationships and lubricate co-enquiry processes. Participant observation requires researchers to spend some time simply working, talking, eating, drinking, sleeping, celebrating and, generally, sharing in everyday life with the community and its members, all the while taking mental note of how people are behaving, what they say to each other, how they engage with each other and outsiders (including the researchers), what makes them happy, angry, sad, fearful, how they move through their landscape, how and why they make choices, and so on. When key events or insights emerge, the researcher takes note of them and of any attendant learning experiences. Carrying out participant observation throughout the research process requires time and energy, yet can be done easily simply by being present and mindful. If possible, an excellent way of gaining these insights is by adding on ‘participant observation days’ (during which time the researcher simply ‘hangs out’ with community members) to the beginning or end of fieldtrips.

We suggest that facilitators take to heart the central philosophies of the ethical standards provided in Annexes 1 and 2. In particular, the ISE’s Code of Ethics, which takes as its starting point the importance of mindfulness, i.e. “a continual willingness to evaluate one’s own understandings, actions, and responsibilities to others”. If facilitators are mindful of their own power, influence and responsibility throughout the process of co-enquiry, they are much less likely to impose their will or perspective on the community and much more likely to respond effectively to community needs. More importantly, they are much more likely to act ethically and respect the full rights of the communities they are supporting.

Election of community researchers

The co-enquiry research process requires significant amount of community time investment. In many cases communities choose to elect individuals from among their members to carry out the bulk of project activities. Often the community will elect local
researchers who have a particular talent, interest or desire to do research and help their community.

**Voices from the communities: the double role of community researchers**

It is not easy being a community researcher, says Avelino Juan, a community researcher from the Chinantec community of Santiago Tlatepusco. A big issue community researchers have to face is the fact that they volunteer their time to support their community. This can cause friction in their household, if they are choosing to carry out research instead of work in the fields for their family. On the other hand, if they try to do both well, they may face burnout. The tension between working in the community research team for the benefit of the community and working for one’s own family is not easily managed. In some cases, a small amount of remuneration for members of the community research team helps to alleviate some of the tensions. However, remuneration can lead to increasing tensions between the research team and the community at large. One of the communities in the Chinantla resolved this tension by directing the community researchers’ pay (this pay was part of the project budget) to a community fund – to be administered by the community as a whole in their General Assembly – to be used for emergencies or to be used to support the families of the community researchers if they so needed.

It is important that the community as a whole elect the community research team – through customary decision-making procedures – as they will carry a significant amount of responsibility throughout the research process. Facilitators should avoid getting involved in community decision-making during such elections, although they may be required to be present at the meetings. Together, the community researchers, facilitators, and, in some cases, political authorities of the communities, form what can be thought of as the ‘co-enquiry research team’.

Community researchers have a vital role in many co-enquiry processes, as they are the main actors involved in the everyday research activities. Facilitators should encourage them to challenge and question given research methods or ideas, to innovate, and to actively adapt methods as they see fit. In some cases, community researchers have all the skills and enthusiasm necessary for the job; in other cases, they require more support and encouragement. Facilitators are therefore also required to update and adapt their facilitation methods to ensure that community researchers (CRs) remain interested in the project. Processes such as culture circles and problematising dialogues, described in detail on p.37-40, are fundamental tools for maintaining open and productive relationships with community research teams, and for them to maintain good working relationships with the rest of the community throughout the process.

**How can we support the process of community research team election (if we are asked to)?**

The process for electing the community research team should be decided locally, and is usually based on community decision-making practices. However, community members must be informed of what is required from members of the CR team in terms of time, prior experience, curiosity, responsibility, and activities to be carried out. Communities then choose among member candidates that suit these requirements. Simultaneously, if facilitators know of community members who have manifested an interest in
participating in the team, their names can be put forward to the community decision-making body. Once the candidates have confirmed their interest in participating, the community decision-making body organises an election.

It is essential that in their research CRs engage with the plurality of views within the community. This may be complicated if all the CRs belong to the same social grouping in terms of gender, age, status, etc. Ideally, the CR team would therefore be composed of representatives of a diversity of social groups within the community. However, this may not always be possible or even ideal. In some cases, the community will tend to elect young, educated, and, often, male researchers. While facilitators can encourage the election of individuals representing a greater diversity of social groupings by explaining the importance and value of such diversity, they cannot impose this perspective on the community.

On the other hand, as we experienced, in some cases having a greater diversity within the CR group can cause tensions that may hinder the smooth progress of research. In the present example, the CR team was composed of young, educated women and older, not formally educated women; the group's objective was to carry out semi-structured interviews. The group decided to carry out the interviews as dialogues with the whole CR team, and found that the elderly ladies preferred to talk about topics that were not directly relevant to the research, frustrating the desires of the younger women to explore the research topic with interviewees. While such tensions can be worked through with patient dialogue, and eventually even productive as a learning experience for all involved, it is important to reflect on the strengths, opportunities and weaknesses of a highly diverse CR group.

Whatever the composition of the final CR group as elected by community members, it will be essential for the research team to understand and make a point of collecting the views and perspectives of all of the different social groups within the community as they carry out their research.

**How can we make sure that the skills taught to community researchers are of benefit to the whole community rather than simply these individuals?**

Given that co-enquiry relies on the training of a CR team, it is important to ensure that the skills learned by this team are of benefit to whole community. For this, it is necessary that the research carried out by the CRs aims to benefit the whole community rather than the CR team alone. This is best done by following the guidance in this manual regarding the assessment of research needs and establishment of research questions, both processes that require the input of the whole community through structured dialogues. Community-wide structured dialogue must be maintained throughout the co-enquiry process to ensure that the research carried out progresses for the benefit of the whole community. If these basic principles are respected, the CR team becomes a tool for the community as a whole to engage in a co-enquiry research process.

From another perspective, it is possible for the acquisition of new skills to be democratically shared among members of the community. In one of the communities
with whom co-enquiry was carried out for the production of this manual, the entire community benefited from the co-enquiry process because the collective decision was that every member of the community should belong to a specific team.

**Assessment of research needs and core themes**

The first step in the co-enquiry process proper is the collective assessment of community needs. Based on the problem or issue the community has decided it wishes to work on, facilitators support the community to undertake a process of refining research needs. Specifically, this element of the process seeks to determine the principal community concerns or problems, so as to ensure that the subsequent co-enquiry research process concludes with a practical solution to those problems. This process often requires facilitation, as community members may not have a pre-established consensus regarding their research needs. However, in some cases, the community has already completed a process of dialogue and discussion to establish research needs in which case this stage can be omitted (e.g. in Latin America, the *Plan de Vida* process,⁶ which is being carried out in many communities, can help establish research themes and needs).

**How can I help the community assess their specific research themes and needs?**

**Firstly, the facilitation team must get acquainted with the context of the community they are working with.** A first step is to read reports, histories, ethnographies and relevant papers. In particular, it is suggested that facilitators spend time talking with elders, authority figures, and other people with experience in the community as well as with other non-community local actors. This will help them understand some of the overarching concerns of the community, allowing them to orient the discussion on research themes. Nevertheless, it is only the community's collective decision-making body that can make final decisions; research themes will have to be fully discussed in this collective space prior to considering them final.

**A second step is to clarify the relationship between facilitation team and community.**

Communities have many needs, many of which will not respond to the objectives of the project that is being launched. It is therefore important to clarify the role of the facilitation team prior to beginning the research process. This can take place through a community-wide dialogue that examines the following topics, amongst others:

1. **How did the relationship between the community and the facilitation begin?** Who called upon who and why? What are the interests of both parties? Although facilitators, community authorities and some community members will know the answers to these questions, it is important to define these answers collectively and to take note of the answers. This ensures that everyone agrees on the foundations of the relationship between community and facilitation team. Ideally, there would be written accords or minutes upon which to base the answers to these questions; if there are not, more time may be necessary to fully explain to all community members the origins of the relationship.

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⁶ There are many references to *Planes de Vida* available on the internet (e.g. [http://www.territorioindigenaygobernanza.com/planesdevida.html](http://www.territorioindigenaygobernanza.com/planesdevida.html))
2. The roles, responsibilities and limitations of the facilitation team must be fully transparent. It is important that the facilitation team (i) be clear about the nature of the outside institutions to which the team belongs; (ii) share the full project budget – including budget lines that are dedicated to salaries and institutional costs for the facilitation team; and (iii) inform the community of the facilitation team’s experience, knowledge and personal commitment.

3. The community must also inform the facilitation team of its own limitations, including of time, energy, resources, etc.

4. It is essential to establish, at the outset, the form in which decisions will be made between the community and the facilitation team, and to clarify who has the final say in how the research is carried out, what information is published, etc. Although it is understood that this is a responsibility held by the community it is essential that all research participants agree to this in a formal community setting and have it in writing.

**Culture circles: creating space for a dialogue of knowledges.** Based on the fact that co-enquiry requires a process of technical training in research methodologies and that facilitators are generally responsible for propelling the co-enquiry process through funding, the relationship between the research facilitator and the community researcher often appears like the relationship between teacher and pupil. It is important that this asymmetric relationship be recognised, critically analysed and worked through, and this is done by creating a recurrent space for dialogue between the three entities involved in co-enquiry: the facilitation team, the community, and the community research team.

Based on the work of Brazilian radical pedagogue Paulo Freire (1975, 2007), the authors use the term ‘culture circle’ to name this space for dialogue. A culture circle is a space that ensures a continuous attention to participants’ readings of reality, to the assumptions that underscore these readings, and to contradictions in the readings. In other words, it is a space that foments a continuous search to expand the group’s human capacities to investigate, create, and solve problems. In the space of a culture circle, members of the group sit together in a circle and dialogue freely: both words and silences are permitted, and both must be engaged with critically. Culture circles can also be carried out through walking or hiking dialogues that conclude with a sit-down circle.

Culture circles are the space within which co-enquiry takes place. It is different to a workshop or a class where all activities are organised with the aim of enabling the teacher to teach the student. Culture circles are spaces where everyone is teacher and everyone is student: everyone has wisdom, knowledge, experience and abilities to share. It is the space for mutual learning *par excellence*. The dialogic and mutual learning spirit of the culture circle should be held throughout the co-enquiry process, even when more conventionally styled workshops are required for training purposes.

Although the culture circle is a proposal that arises from the facilitation team, the community may also have its own systems for profound collective reflection, and these
should be integrated into the co-enquiry process as much as possible. Sometimes community members already have experiences with Freirean culture circles, in which case the process can be built using their knowledge and perspectives.

The themes to be discussed collectively must be proposed based on a reading of current community realities. Using the culture circles method, the following are some steps that can help towards defining the research themes:

1. The first decision to be made is the scale of the research. Maps can be used to help visualise the issues prior to decision-making, although geography will not be the only scale involved in the process: cultural and political scales will also be envisaged. The scale chosen – whether it is community, neighbourhood, region, etc. – will depend on the nature of the community research team, the limitations of the facilitation team, the interests of the community and finances.

2. Once the scale of the research has been chosen, it is important to remind participants of the nature of the relationship between the community and the facilitation team. In particular, the specific, shared theme that brought these two entities together, what experience the facilitation team has to offer, how the knowledge and experience of community research team and facilitation team can fruitfully complement each other, etc.

3. Based on this reminder, a group brainstorm for making a comprehensive list of community problems or issues is held. For this step it is essential that all members of the community participate, including women, the elderly, youth, and children. Based on the results of the brainstorm, connections are made between the problems on the list and the common theme shared by the facilitation team and the community. Separately, the group makes a list of all of the problems that engage the common theme and that operate at the chosen research scale. It is important that the problems are noted down, on a board or in a notebook, so that the group can return to them when necessary.

4. The problems that engage with a common theme at the research scale chosen can be critically appraised through a ‘problematising dialogue’\(^7\) (see below) so as to (i) locate them in the broader context of the community, (ii) relate them to other spheres and scales, and (iii) reflect on their probable causes and how they are affecting the community economically, politically, culturally, spiritually and environmentally. It is important that participants are well prepared to discuss a specific topic during this process as this will help focus their interventions. The facilitation team must also be well prepared so as to avoid improvisation; they must have the cognitive tools necessary to understand what is at the core of the issue/problem through the questions, answers and points made during the dialogue.

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\(^7\) The official English translation of the Spanish verb *problematizar* is ‘to problematise’. However, the authors feel that this translation is awkward and jargon-like, so they sought a different translation. The concept of *problematizar* means to critically analyse, challenge, and question; in effect it is based on Freire’s (2007) problem-posing methodology for education. Thus the concept of *diálogo problematizador* or ‘problematising dialogue’ means to engage in a discussion that elicits critical appraisal of an issue, whereby problems are posed – rather than solved – by participants and critically engaged with in dialogue.
5. Based on this problematising dialogue, a final series of problems are chosen for the co-enquiry research to address.

6. In order to make this choice, it may be useful to reflect on what the community feel would be an ideal result once the problem is resolved. The ideal result is also critically appraised using the tools of the problematising dialogue.

7. It is important to emphasise that this is an exercise of imagination to help motivate and generate action, and that community commitment, engagement and work are required to work towards the solution.

Problematising dialogue

The problematising dialogue process – which is also based on Freire (1975, 2007) and an integral element of the culture circle process – calls into question all of the assumptions that research participants (community members, community researchers and facilitators) have regarding the theme/problem under discussion, including knowledge and information available from academic sources or community authorities. The specialist knowledge of the facilitation team must also be put through this process of doubt. The problematising dialogue examines the relationships between the theme/problem and the different spheres of reality – economic, political (what can be done), cultural, spiritual, and environmental – in the community. It reveals the relationships between the theme/problem and the different actors, times and scales that are directly or indirectly involved in it.

Some of the basic questions to launch the problematising dialogue on the theme/problem are: Why are we addressing it? For what? How? For whom? Other questions that help challenge and critically appraise the theme are:

- When did the problem start? How did it start? How is the problem maintained (how does it continue)?
- Where did it start? Does it take place at another scale: household, neighbourhood, town, region, state, county, continent, planet?
- Why does the problem happen? What or who causes it? What are the economic, political, cultural, spiritual or environmental causes?
- What are the economic, political, cultural, spiritual and environmental consequences?
- Who participates in the problem? Who or what suffers its consequences? Who are what maintains it? Who are what benefits from it?
- How are we dealing with the problem? Are there people who have more experience in dealing with these problems?

The outcome of the problematising dialogue is a group of participants and community members who have carried out an in-depth and critical reflection of the themes they wish to tackle through co-enquiry research. They have a solid and shared understanding of the important parameters and perspectives on the problem, and are able to engage in the process of research with a wide analytical toolbox. The process of the problematising dialogue can be used throughout the research cycle to tackle a diversity of topics that
require in-depth reflection (see the Community and Co-enquiry Research Protocol on socio-environmental change in Chapter V for another context in which the problematising dialogue is used).

**Development of research questions**

For each specific research theme, the co-enquiry team will define a set of guiding research questions. In the field experience that informs this manual, communities as a whole defined the research questions, as all members wished to participate in this foundational process. The community research team then refined them for use in the subsequent research phase – the development of methodologies. If the research theme has emerged from a community-based problematising dialogue process as outlined above, it is suggested that the elaboration of the research questions be carried out in tandem, during the research theme stage of the cycle. However, if the research themes are already in place or pre-established by the community, the elaboration of research questions can be based directly on these.

Co-enquiry research questions, like conventional research questions, must be clear, focused on one topic at a time, non-leading and manageable. Within a co-enquiry framework they must also be translatable to the local language, which means that internal consistency and simplicity are essential. In line with the requirements of action research, they must also be relevant to the resolution of a problem and yield answers that are actionable. Time investment in dialogue processes (as above) and in participatory translation of concepts and research questions are key to the success of this element of the co-enquiry research cycle.

Language is important tool to reach a common understanding, between facilitators and community researchers, of the various elements and terms required to carry out a successful research process. Time should be dedicated – both during the research question development phase and throughout the rest of the project – to developing and refining a common understanding of key terms for particular processes, objects, tools, approaches, environmental elements, concepts, etc. At this stage of the research cycle, generating a common understanding of key terms will help to define clear and mutually intelligible research questions.

**What props can we use to help us collaboratively develop co-enquiry research questions?**

In the context of COMBIOSERVE co-enquiry research in the Chinantla surrounding natural resources and land use, we adapted a process based on mapping of conflicts and opportunities developed by consortium partners INECOL and UEFS, combined with a problematising dialogue and knowledge exchange. By way of example, the following describes the practical steps taken to develop research questions surrounding natural resources in the Chinantla:

a) Creating a basic map of natural resources, their uses, opportunities and conflicts
The research team created an initial general mind map of natural resources, their uses, opportunities and conflicts surrounding them within the community territory. Community researchers drew a map of their territory on white flipchart paper, including basic geographical elements such as community boundaries, main water bodies, mountains and hills, the urban areas, main roads and landscape units. The group then came up with a common definition of key terms: territory, territorial use, landscape, landscape unit, land use change, conflict and opportunity.

b) Mapping conflicts and opportunities

Using the map as the main source of information, the group discussed and wrote down:

- Natural resources found in each landscape unit
- General uses of those resources
- Conflicts related to those resources
- Opportunities related to those resources

Two map layers were using 2 sheets of tracing paper. Resources and their uses are identified on the first layer; conflicts and opportunities on the second. When identifying conflicts and opportunities, special attention was given to external and internal initiatives and projects that are present in, or relate to, each landscape unit. On each sheet, marks, labels, signs and icons can be drawn to identify the different elements.

c) Systematising the results of the mapping exercise in a matrix

Upon completion of the map, the table below was drawn up on a separate white flipchart page. For each landscape unit, the information about resources, uses, conflicts and opportunities will be registered.

Table 1: Basic matrix of natural resources, their uses, conflicts and opportunities in the Chinantla context

<table>
<thead>
<tr>
<th>LANDSCAPE UNIT</th>
<th>Resources</th>
<th>Uses</th>
<th>Conflicts/opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>Wood</td>
<td>House and furniture building</td>
<td>Illegal logging</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Payments for Environmental Services</td>
</tr>
<tr>
<td></td>
<td>Firewood</td>
<td>Cooking and heating</td>
<td>Ensuring an adequate supply of firewood for the community</td>
</tr>
<tr>
<td>Animals</td>
<td>Food</td>
<td>Game</td>
<td>Formal management units</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of information about populations</td>
</tr>
<tr>
<td>Acahual (secondary forest)</td>
<td>Animals</td>
<td>Food</td>
<td>Lack of information about populations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game</td>
<td>Hunting restrictions</td>
</tr>
<tr>
<td>Coffee plantation</td>
<td>Coffee</td>
<td>Sale</td>
<td>Low prices</td>
</tr>
<tr>
<td></td>
<td>Fruits</td>
<td>Food</td>
<td>Alternative to junk food</td>
</tr>
</tbody>
</table>
(iv) Defining research themes and questions

Using the above table as a source of systematic information, the three steps were followed to help the research team choose locally relevant and interesting themes for a co-enquiry research process:

1. **Problematising dialogue about the synthesis table.** This stage of the process aims at questioning the process by which the matrix was developed and deepening participants’ understanding of its contents. The dialogue may result in some final changes to the content or structure of the table; more importantly it will result in the group having a greater understanding of the importance of the process they are engaged in and of developing precise research questions.

2. **Identification of a list of research themes that the team wishes to address.** Using images illustrating the themes written up in the table – in this case hunting, food, community control, care for the territory, tradition, etc. – the facilitators launched a second group dialogue aimed at pinpointing key themes for community research. This dialogue must be given ample time and cannot be rushed; in this way participants feel they can speak freely, clarify and engage in fruitful discussion when opinions diverge, and come to an optimum consensus.

3. **Prioritizing the research themes;** this can be done simply by voting on the different themes.

4. **Defining research questions.** This section constitutes the fine-tuning of the broad research questions or themes. Following the thematic prioritization exercise carried out, the first three most important themes were selected. For each theme the facilitator guided the identification of a series of very specific research questions. The group began discussing they kind of information required to answer those questions, the feasibility to address them, the need of specialists, etc. Given that the resulting research questions will guide the entire co-enquiry process, it is important that this stage in the process is not rushed and that all members of the team are given the time to reflect and participate in the dialogue. Sufficient time and energy must be devoted to elaborating the dialogue and space must be given for participants to air constructive criticism and improve the process.

### Developing co-enquiry methodologies

Once the research questions have been established, the co-enquiry team can decide what methodological approach to take, and based upon this, the team identifies specific methods for data collection. Ideally, and usually after many years of practice and reflection, co-enquiry encourages community researchers to develop *sui generis* research

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*The milpa is the traditional multi-cropping system used in Mesoamerica, the basic crops of which are corn, beans and squash (although there are also many others, which vary according to region, ethnicity, etc.). A swidden fallow system is used for milpa cultivation. The term recurs often throughout the deliverable.*
methods or to identify traditional methods that help to answer their research questions. However, in the long-term field experience upon which this manual is based, conventional research methods are most often used as a basis for the development of community-based approaches and adaptations. Effectively, GDF’s attempts at encouraging Chinantec community researchers to develop *sui generis* methods – whether to examine social or natural phenomena – have not yet yielded methodological innovations. Instead community researchers prefer to be taught conventional methods that they then question, challenge, test and adapt to their own realities, abilities and research questions.

The authors hypothesise that this may be because (1) the research questions communities are currently asking engage with external themes and interventions that do not belong to known community processes and therefore cannot be answered using their own approaches to investigation; (2) the conventional method is highly effective and more easily applied than devising *sui generis* approaches; (3) by fully knowing (and then challenging and adapting) conventional research methodologies, community researchers are empowering themselves to take control of the tools so often applied by outside actors; (4) the creation of wholly new methods require significant time, energy and effort that are seldom available to community researchers given their other subsistence activities, cultural patterns, or, sometimes, the unfortunately entrenched notion that outsiders ‘know better’; and, of course, (5) lack of ability within the facilitation team to guide a community research team in the process of innovating methodologically.

It is also possible that in communities that have received less outside intervention than those in the Chinantla, there is a greater possibility of fomenting local knowledge-based methodological innovations among community researchers. This idea would require further research and substantiation.

Whether the community research team is willing to work on the development of *sui generis* methodologies, or wishes to learn how to handle conventional research methodologies, local knowledge and ways of knowing are privileged. If the conventional methodological approach provides a useful frame upon which to base the development of specific methods, these can still be integrated with local knowledge and understandings of the world. Please see the specific CRPs for more details on the development of methods that integrate local knowledge with scientific structures.

Building the methodological framework together is an essential and time-consuming stage of the co-enquiry process. Although each social situation is unique (in terms of the level of knowledge of community researchers, type of research questions defined, time available, etc.), it is likely that the process by which methodologies are developed is a combination of: (i) further exploration, led by the facilitator, of the action research cycle (see above), as the graphics used helps community researchers to visualise how the methods chosen depend on the research objectives and questions, and (ii) facilitated dialogue, during which community researchers are encouraged to raise questions and to reflect on how they answer questions in their daily life.
How can we integrate local ways of knowing and conventional methodologies to create a solid co-enquiry methodological framework?

Outsiders may not easily grasp the content and form of indigenous or local knowledge unless they have the opportunity to spend long periods of time getting to know and experiencing life in the community. Moreover, while many local people understand the importance of their knowledge and of knowledge transmission, increasing encroachments from outside ideas of progress, often accompanied by discourses of disdain for local expertise by outside actors (including government agents, NGO staff, nearby townspeople, etc.) and sometimes even other community members, soften results in local knowledge either being scorned or guarded. Therefore, a fundamental tool to help outsiders understand how local knowledge operates, which forms the basis for a dialogue between Western knowledge and indigenous knowledge, is participant observation and ethnographic research (see Comment box, p.33)

On the other hand, although scientific methods appear relatively standard in the literature, in practice all aspects of scientific research – including how to resolve problems of observation, description, quantification, analysis and communication – are under constant revision. Scientific theories and methods are in a constant state of evolution, including as a result of dramatic paradigm shifts. It is important that community research teams are made fully aware of the changeable nature of scientific methods, techniques, hypotheses, and theories: it is empowering for them to know that scientific approaches do not constitute fixed truths and that we all follow certain scientific guidelines, while also creating new guidelines to help humans to know the universe and to act appropriately when faced with problems. It is suggested that a culture circle on the topic of Science be carried out with the community research team or the community as a whole if they wish.

Dialogue is the primary guide for integrating methodologies; and this dialogue includes the notion of problem-posing critical analysis discussed above. In other words, a first step in the dialogue is to call into question assumptions – both of the community research team and the facilitation team – regarding research themes. This must be done with full respect for the empirical and specialised knowledge of members of both teams; it is understood that all perspectives are necessary to the elaboration of the co-enquiry process. It is also important to elucidate, at the outset of the dialogue process, what it is that members of the community know about the research theme. Sometimes community experts can be invited to provide more in-depth knowledge on the topic; they can be invited to the thematic problematising dialogues, or, should they not be able to assist in these, the results can be discussed with them afterwards.

Everyone, in each research team, knows a great deal, something or nothing depending on the topic under enquiry and their experience. Both the community research team and the facilitation team must be explicit and self-reflexive about their abilities, while avoiding false modesty or exaggeration. A game (for points) of questions and answers on specialised topics that relate to the research theme can help render this truth more explicit (see Freire 1977). The facilitation team asks >10 questions on topics of their expertise, and the community research team asks an equivalent number that concern their specialty. The answers of each team will show that the community research team are
experts in some aspects of the overall research problem, while the facilitation team are experts in others.

Another means to support the process of integration between Western forms of knowledge and local knowledge is through ethnomethodology. The exercise in ethnoclassification (see the CRPs on plant monitoring and fauna monitoring in Chapter V) is a good example. Using images of plants or wild animals, facilitators ask the community research team to group the images according to common characteristics. Facilitators then demonstrate how Western science categorises the images. This is the first step in understanding how community members know, and how the local language categorises, the world; it also provides a simple and visual comparison of the two epistemologies. Based on the similarities and differences between the two epistemologies, the methods can be designed or adapted in such a way as to render them cognitively available to both teams.

**Methods training, assessment and adaptation to local conditions**

If the approach chosen by community researchers is based on conventional research methods, this stage of the research cycle requires the research team to begin a process of training. The training process begins with the facilitator reflecting on how to simplify the method without losing consistency, validity and reliability and how to communicate the method clearly; it follows with the research group organising a training workshop. During training workshops, priority is given to questioning the method, reflecting on its applicability in the local social and environmental context, and discussing possible local adaptations. These workshops must also make time for field-based methods testing as it is during these test practices that some of the key adaptations will be integrated into the method. For further information on how to train community researchers, and adapt methods to local conditions, please see the separate CRPs in Chapter V.

The data resulting from field-based practices must be collectively examined to ensure that it is useful and appropriate. If it does not quite achieve expectations, the methods must be reviewed, amended, and implemented again. In other words, this stage of the co-enquiry research cycle requires patience, endurance, innovative thinking, and constant encouragement. It can take months for a community research team to reach the stage at which they are fully satisfied with, and in control of, the methods they are implementing and the results obtained. Once the community research team feels in control of the adapted methods, they can be tasked with carrying out the field research. The facilitator will be available to answer questions and help resolve problems in the field.
Comment: Continued engagement

Given that the methods adaptation requires considerable input by the facilitator, this is an appropriate stage in the research to remind oneself of the importance of continued engagement (see also p.23-4). Community researchers need continued support as they implement the co-enquiry methods: follow-up workshops and informal field visits are essential components of that support. In the field experience informing this manual, monthly field visits of between 4-7 days are a minimum requirement for community researchers to feel adequately supported.

Often the support required is of a technical or methodological nature. However, facilitators should also be prepared to engage in emotional, social or political issues. For example, in the Chinantla, the facilitation team was asked to devise a process for supporting a community research team whose motivation was flagging because other members of the community had begun to question the research process. The support devised was based on a wide variety of sources, including Paulo Freire’s Pedagogy of the Oppressed (1968), Baruch Spinoza’s The Ethics (1677), Hui Neng’s Platform Sutra which discusses detachment (6th – 18th century), Genrich Altshusser’s Theory for Inventive Problem-Solving (TRIZ), Michael Cohen’s concept of Ecopsychology, and methods of co-counselling which involve mutual reflection and reaction among participants. Please see the CRP on Innovative approaches in Chapter V, and Chapter VI on co-enquiry monitoring and evaluation for further information.

Analysis and results write-up

The process for analysing data will depend on the methodology used (please see the individual CRPs for methods-specific data organisation and analysis tools). The priority at this stage is that the community research team has full ownership of the analysis, which requires them to fully understand it. Given that some of the data formats that result from the methods used may be unusual for the community researchers (e.g. notebooks of long-hand interview answers), processes for data analysis must be kept as simple as possible. A few rules of thumb for developing simple and effective data analysis processes that are understandable are to focus them on:

1. Finding solutions to the problems originally described during research needs stage of the cycle – i.e. a process of analysis that juxtaposes the data with the original research themes/questions is helpful;
2. Encouraging autonomy in analysis among the community research team – i.e. a process that makes very clear relationships between the research themes, questions, methods, data, and resulting analysis is key;
3. Targeting the analysis process to the audience for which the research is being carried out. In a co-enquiry context, the community decides who the research audience is. It is likely to be the community itself, but it may also include outside actors whom the community wish to communicate with.

For facilitators who are used to carrying out conventional research, it may be difficult to relinquish cherished systems for analysis, particularly those that require computer skills. Nevertheless, the process of simplifying and decoding procedures for data analysis can be an interesting and enlightening personal challenge for researchers.
Given that co-enquiry is a continuous and iterative process, the results of data analysis can feed into a new set of research questions, which require new methods to be developed, and so on. The process of analysis can therefore launch new research ideas and projects among the community and research team.

**How can the results of a co-enquiry process written up in such a way as to respond to both community and academic needs?**

This is one of the greatest challenges of co-enquiry. It is most important that research objectives, expected results as well as *how these results will be written up and shared* be very clear to all participants at the outset so as to avoid conflicts arising at the write-up stage. It is suggested that the co-enquiry team envisage a number of different formats in order to satisfy the needs of all parties:

- Academics often require papers to justify their funding and continued recognition as academics. Individual community researchers or the community research team as a whole must be invited to be co-authors on these papers, pending an in-depth analysis of the implications of this co-authorship for all parties.
- Communities often need official documents containing the results of their research to present to government agencies and civil society institutions. The facilitation team is required to help communities elaborate those documents.
- Communities also need popular/easy-to-read documents to help with their internal dialogue processes; these documents will need to show the important results of the research and contain the questions that remain unresolved.
- Communities often need to strengthen their formal education systems. Another outcome of co-enquiry can be the preparation of instruments for schools, which may include unresolved and open questions for youth groups to seek to resolve.

**Community validation**

Once the research results have been written up in a format that is satisfactory to the community researchers, it is important that the entire community validate these results. Ideally, CRs would lead the process of validation with support from the facilitation team. In the CRP for Basic Social Science research methods in Chapter V (p.183-227), we provide a protocol for training community researchers in workshop leadership and organisation, for the precise purpose of validating research results. If this is not possible, the facilitation team should lead the community validation workshop.

This workshop should include a presentation reminding participants of the original research questions, as well as the associated methods and processes for data analysis used by the research team. Following this, the community researchers present the final results and priority is given to a full and participatory discussion of these results.

**What do we do if the results do not satisfy the community at large?**
Communities and the institutions to which the facilitation team belong should continuously evaluate the process of co-enquiry, both separately and together (see Chapter VI). This constant evaluation must be carried out according to schedules established in the project: it is suggested that every 2 or 3 months, research participants and community members meet officially (in a community assembly for example) to carry out an evaluation dialogue in order to resolve contradictions, doubts, misunderstandings, gaps in the information, etc. All community members should be invited to participate in these evaluations and given the space to air their concerns or questions, and to confirm or challenge the co-enquiry process.

If, at the end of the process of co-enquiry, and despite this constant monitoring and evaluation, it appears that the results do not satisfy the community at large or do not help to answer their fundamental questions, a process of sincere self-reflection is required. Did the community research team and facilitation team go through the due process for eliciting the overarching research theme? Were the research questions appropriately targeted for resolving the theme/problem decided upon by the community? Did the co-enquiry research team promise too much? Where did the misunderstandings arise? How could they have been avoided? The lessons learned from this self-reflection process will be invaluable to all concerned.

**Using the results for community decision-making**

Often the results of co-enquiry research can be very useful to help the community at large make informed decisions and resolve issues regarding internal organisation, natural resource management, and relationships with outside entities amongst others. Although the facilitation team should remain at the margins of the internal process through which results are rendered useful, it may be called upon to support a reflection process within the community. The techniques of the ‘problematising dialogue’ discussed below, p. 229-230) are recommended for this purpose. (See Chapter VII for a discussion of co-enquiry dissemination of results).
IV. COMBIOSERVE experiences in participatory and co-enquiry research

In this section we share experiences and lessons learned in co-enquiry approaches that have emerged in the other COMBIOSERVE fieldsites of Pilón Lajas (Bolivia), Calakmul (Mexico) and Southern Bahia (Brazil). We also share some of the methodological innovations for assessing the effectiveness of community-based conservation developed by academic partners. Those chapters currently in Spanish and Portuguese will be translated into English when the manual is published online.

From the field: community based-research processes, experiences and lessons learned

Participatory mapping: A experiência do projeto COMBIOSERVE de mapeamento participativo com comunidades Pataxó de Porto Seguro (Bahia, Brasil)

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Percepção espacial e mapeamento participativo
Na realização de estudos sobre a percepção ambiental e territorial numa área, torna-se necessário analisar o olhar e as práticas de determinado grupo sobre o espaço que ele vive. O estudo sobre a percepção, a identidade, assim como o reconhecimento da ideia de pertencimento que as populações possuem sobre estes espaços são imprescindíveis para obtenção de melhores resultados no que se refere à implantação de projetos e políticas públicas ambientais. Portanto, visto que a noção de território diverge entre as diversas sociedades, o trabalho de mapeamento participativo torna-se uma ferramenta importante no auxílio do reconhecimento do território sobre a ótica do grupo, principalmente em se tratando de relações interculturais, ou frente a movimentos para reconhecimentos de direitos territoriais frente aos Estados. Para isso, tem-se como fundamento que o território, não é definido apenas por sua inmemorialidade, ou por fronteiras arbitrárias definidas pela extensão territorial e pela apropriação dos recursos naturais nele existentes, mas, sobretudo pela forma de viver e habitar e pelos aspectos simbólicos construídos por determinado grupos.

Nas comunidades tradicionais e povos indígenas prevalecem formas de gestão comunitária do território. A localização, percepção e relações com animais, plantas,
rochas, montanhas, rios, riachos, lagos, córregos, poços (e para as populações litorâneas, a praia, o mar), bem como os movimentos de humanos e não-humanos, desempenham um papel fundamental num processo de gestão coletiva para a produção e reprodução social e simbólica de determinados modos de vida. O ambiente vivido, a noção de territorialidade é refletida nas percepções particulares, e muitas delas são reconhecidas pelo grupo. Por isso, quando se fala em identidade territorial busca-se estabelecer relação entre os valores individuais e coletivos dados ao território. Portanto, para o enriquecimento da análise espacial as pesquisas sobre percepção ambiental requerem o diálogo entre diversas ciências, como a Psicologia, Antropologia, Sociologia, Geografia, Biologia dentre outras. Tendo em vista que os processos perceptivos são estruturados a partir nas experiências vividas e dos significados que daí emergem, fornecidos através do diálogo entre o mundo material e imaterial, se utilizam nesses estudos os mapas como expressão possível de uma realidade, visto que os mesmos podem ser um ponto de partida para as pesquisas e a gestão do território, em geral. Aqui é importante frisar a diferença entre mapear e produzir mapas. Mapas podem ser entendidos enquanto um esforço de representar o mundo e suas relações, totalizando-o, assim se constituem como um modo particular de mapear. Há diversas outras formas de mapear que preservam performances, movimentos e relações, e que são eficientes na localização cotidiana e histórica das pessoas, mas que não visam necessariamente realizar totalizações e fixações no tempo (GELL, 1985; INGOLD, 2000; TURNBULL, 1994, 2003).

Visto que se pretende compreender as inter-subjetividades contidas nos mapas, a discussão e produção dos mapeamentos participativos relacionados à percepção ambiental trouxeram a necessidade de defini-los tomando-se como base à abordagem humanística dentro da ciência geográfica. Onde, a fenomenologia nesse processo de percepção do espaço, fornece subsídios para análise do mundo percebido e vivido. No entanto, para analisar as relações do ser humano com o ambiente é necessário compreender, como se encontra estruturado esse espaço percebido, mas não podemos deixar de ressaltar que há uma crítica poderosa a esta abordagem dos mapas mentais ou cognitivos adivindo tanto da antropologia quanto da geografia fenomenológica (MERLEAU-PONTY, 1999; INGOLD, 2000; KITCHIN & DODOGE, 2009; TURNBULL, 2003, 2007; WOOD, 2012), uma vez que mapas não estariam estruturados na mente, nesse caso, pois isto pressupõe separação mente-mundo, e a extração da mesma.

Desta maneira o conhecimento espacial adquirido pelas sociedades humanas consiste, sobretudo, de construções oriundas de movimentos e trajetória de pessoas imersas num mundo a partir de sua percepção. Portanto, os mapas mentais na percepção ambiental, não devem ser vistos apenas como produtos cartográficos, mas, sobretudo como instrumentos que auxiliam na comunicação, interpretação acerca dos aspectos ambientais e territoriais. O mapa, no seu sentido mais amplo, exerce a função de tornar visíveis, pensamentos, atitudes, sentimentos, sobre a realidade percebida. Os mapas, portanto, por serem construções na dinâmica de um mundo vivido devem ser lidas como processos e não como produtos estáticos do conhecimento.

_Mapeamento participativo e co-investigação com comunidades Pataxó, no sudeste da Bahia no Projeto COMBIOSERVE_
O mapeamento participativo foi uma das principais ferramentas utilizadas para promover o diálogo de saberes na experiência de Diálogo Intercultural em Gestão Etnoambiental e conservação biocultural com pesquisadores indígenas no contexto do projeto COMBIOSERVE no sudeste da Bahia. Esta experiência foi realizada conjuntamente por pesquisadores das áreas de antropologia, geografia e ecologia, lideranças e jovens da etnia Pataxó, tendo como princípios a aprendizagem através da co-investigação, a educação pela pesquisa e a intercientificidade. A experiência visou à criação de espaços de diálogo e compartilhamento de informações, conceitos e técnicas oriundas dos múltiplos conhecimentos tanto técnicos como indígenas. Com consentimento e apoio das lideranças das comunidades da Reserva da Jaqueira (Terra Indígena Coroa Vermelha) e da aldeia de Pé do Monte (Terra Indígena Barra Velha) se desenvolveu a Formação Intercultural com base em oficinas, momentos de encontro entre todos os participantes do curso, palestrantes e a participação de convidados; bem como momentos de pesquisa na comunidade, formuladas pelos participantes da formação.

Antes de entender os usos e mudanças no uso do solo propriamente ditos, buscou-se criar espaços para exercitar o diálogo simétrico entre conhecimentos orientados por perguntas como: quais as percepções e conhecimentos sobre “conservação”? Quais técnicas e saberes são postos em práticas para compreensão do ambiente e do território? E quais seriam as noções de “sucesso” em termos de estratégia de conservação? Ou ainda: como avançar/ testar/ propor metodologias de co-investigação e indicadores de sustentabilidade?. O mapeamento entrou nesse processo justamente como uma ferramenta de diálogo intercultural sobre o território indígena Pataxó. A produção coletiva de mapas permitiu localizar e definir ambientes, conflitos, histórias, redes de trocas, moradias, limites, áreas de caça, áreas de retirada de madeira, áreas de atuação da Catumbaiá (ser mitológico pataxó protetor das matas), trilhas antigas e recentes, cursos d’água e qualidade dos mesmos, além de vários outros aspectos geográficos do território e seus significados (Figura 1). Um dos principais resultados dessa experiência foi a efetiva apropriação dos seus produtos (mapas, redes de conflito, análise da mudança de uso do solo etc.) pelas lideranças Pataxó presentes na experiência de diálogos, em sua prática política de demanda por reconhecimento de direitos territoriais bem como em seus fóruns de discussão com outras lideranças indígenas Pataxó do sul da Bahia.

Figure 1: Karajá e Pop desenhando o mapa da Terra Indígena Coroa Vermelha (esq.) e Karajá explicando o mapa para demais participantes do curso (dir.).
Outra abordagem que se utilizou na experiência de mapeamento com os Pataxó foi o uso de geotecnologias, que coincidiu com uma demanda dos próprios pesquisadores comunitários de se apropriarem dessas novas ferramentas para fortalecer e ampliar suas estratégias políticas de retomada de seu território (Figura 2). Entre as diversas geotecnologias, foi de grande relevância o uso de imagens de satélite, que tem sido facilitada pela sua distribuição gratuita em diversos sites, pois possibilitou uma forma diferenciada de enxergar o território, ou seja, possibilitou uma visão sintética e em escalas variáveis. Entretanto, outro grande potencial testado nessa experiência com os Pataxó, foi a possibilidade de georreferenciamento dos temas presentes nos etnomapas produzidos tendo por base uma imagem de satélite e sua posterior inserção em um Sistema de Informação Geográfica – SIG (Figura 3). Um SIG construído com dados oriundos de etnomapas, ou do processo de construção destes, são comumente denominados de EtnoSIGs (TRANCOSO et al, 2012). Os EtnoSIGs possibilitam a sobreposição, contraposição e modelagem de dados, étnicos e não étnicos, com finalidades diversas. As possibilidades de análises e sínteses se multiplicam, onde o olhar de diferentes culturas se cruzam. O diálogo intercultural também se fortalece, pois há a apropriação de técnicas de geoprocessamento pelos grupos étnicos, assim como uma aprendizagem conjunta sobre o território. Desta forma, a representação espacial de uma paisagem tem no processo de construção dos etnomapas e dos EtnoSIGs uma maior relevância. Ou seja, o processo se torna mais importante que os produtos, pois há uma troca de conhecimento entre os atores envolvidos, sejam eles oriundos de comunidades tradicionais ou não.
Considerações finais

Nas palavras do Cacique da Reserva da Jaqueira, Carajá, sua experiência de mapeamento no projeto COMBIOSERVE foi também uma experiência de vida, seu depoimento a seguir representa sua própria análise da experiência, que apresenta sua visão sobre a importância do ato de mapear como uma ferramenta sociopolítica, e como o seu conhecimento do território pode ser potencializado pela apropriação de tecnologias modernas de mapear:

“Para mim este trabalho com os mapas foi o melhor estudo que eu já fiz na vida. Eu não só aprendi a fazer o mapa da Coroa, como de outra aldeia e como eu aprendi também a usar o mapa como uma defesa em favor do meu povo. O conhecimento que eu aprendi no mapeamento serve para fazer em outra área indígena. Poder dizer que onde meu povo está é realmente dele. O trabalho que nós fizemos foi uma vida que eu vivi. É o mapa que eu vivi trabalhando. Eu aprendi muito mais e eu mesmo fiquei feliz. Hoje eu sei pontuar uma comunidade indígena e o mapa, se precisar fazer, eu faço hoje. A maior dificuldade foi saber trabalhar no mapa e identificar os pontos. Eu sabia que tinha um rio, um córrego, um pé de jaca ou juerana. Para colocar isso no papel é que é difícil. Tem que pontuar e falar onde está. Eu não tinha este conhecimento de descrever. Agora já desenhamos e pontuamos. Com o GPS foi o seguinte. Já conhecia um quadradinho que parece um radinho. Mas aprender mesmo a usar fez parte do nosso trabalho, mas ainda não aprendi bem na prática. Mas já dá para trabalhar com o GPS hoje. Ponto 1, ponto 2, ponto 3... Hoje, sair com um mapa é como sair para facilitar o trabalho. O mapa é a identificação. A pontuação de uma localidade, de uma cidade, de uma terra. O mapa seria isso, trabalhado de acordo com o que a gente conhece. Seria um território!”

Assim, para o desenvolvimento de um processo de mapeamento participativo, ancorado na interculturalidade e intercientificidade, é necessária uma abordagem que trate os múltiplos conhecimentos em conexão, como verdades parciais, como formas legítimas em seus procedimentos, protocolos, práticas e pressupostos ontológicos e epistemológicos, onde o processo de mapear se faz num contínuo constructo de acordos e caminhos pragmáticos, que traga em si as raízes emancipatórias de uma nova forma de
sabedoria para a vida. É nessa perspectiva que este estudo pretendeu investigar o papel do diálogo de saberes na produção conjunta de mapas.

Co-enquiry processes: Co-investigação como abordagem na formação intercultural em gestão ambiental de territórios indígenas Pataxó: a experiência do projeto COMBIOSERVE no sudeste da Bahia, Brasil.

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Reflexões sobre gestão ambiental com os Pataxó

Os temas da conservação ambiental e da gestão territorial são centrais hoje para o povo Pataxó do Extremo Sul da Bahia (Figura 1) Habitantes de uma região que tem passado por processos de transformação profunda da paisagem e do modo de vida das populações indígenas e não indígenas, os Pataxó vem se posicionando de forma ativa na busca por novos caminhos. Podemos citar dois deles como exemplos: a criação da Reserva da Jaqueira, uma área de Mata Atlântica mantida e cuidada pelos Pataxó através de iniciativas de manejo florestal e etnoturismo, e os enormes esforços dos Pataxó para manterem as matas do Parque Nacional do Monte Pascoal.
Mais recentemente, desde fins dos anos 90, os Pataxó iniciaram um processo vigoroso de formação de pesquisadores indígenas capazes de analisar seu próprio contexto sociocultural e ambiental; de legitimar seus próprios territórios; de contribuir com a valorização cultural, o desenvolvimento e disseminação de práticas de manejo florestal e agroflorestal; e de atuar na educação e na saúde do povo Pataxó. Portanto, hoje, entre os Pataxó pouco se fala na realização de pesquisas em que eles estejam na condição de objetos do conhecimento científico, pois eles preferem atuar como sujeitos de suas próprias pesquisas, dialogando com os sábios, mestres e anciãos, promovendo encontros, praticando no cotidiano e se valendo de aportes técnicos e científicos também. Nesse sentido, os Pataxó, interessados em pesquisa, gostam de trabalhar em parceria e dialogar com outros pesquisadores oriundos de outras etnias indígenas, bem como com pesquisadores não indígenas - uma forma de co-investigação.

Atentos a isso a equipe do COMBIOSERVE no Brasil convidou duas comunidades Pataxó para dialogar sobre gestão ambiental de territórios Pataxó – a Reserva da Jaqueira e a aldeia Pé do Monte – e assim embarcamos numa experiência de co-investigação desenvolvida por pesquisadores Pataxó e pesquisadores do Projeto COMBIOSERVE em colaboração mútua, dialogando sobre temas relacionados à gestão ambiental, entendida de maneira ampla como sendo as diversas formas de se relacionar com o território, de habitá-lo e percebê-lo. Para possibilitar um ambiente de diálogo apropriado, propôs-se a realização de uma experiência *Experiência de Diálogo Intercultural com Pesquisadores Indígenas em Gestão Etnoambiental de Territórios Pataxó*, que aconteceu na Reserva da Jaqueira, na Terra Indígena Coroa Vermelha, com duração de dois anos. A experiência teve como princípios a pedagogia da alternância (GIMONET, 1999;
TEIXEIRA et al., 2008) e o aprendizado através da pesquisa e como ferramenta privilegiada o mapeamento participativo.

A realização das pesquisas no âmbito de um processo envolvendo sábios e anciões Pataxó, acadêmicos de diferentes áreas, homens e mulheres de variadas idades, foi pensada enquanto uma estratégia para a criação de um ambiente favorável à produção participativa de conhecimentos, onde imperasse o respeito aos diferentes protocolos de investigação próprios de cada sistema de conhecimento, nesse caso, o conhecimento técnico ou acadêmico-científico e o conhecimento tradicional Pataxó. Buscando desenvolver assim uma proposta contrária às práticas de pesquisa extrativa ou de participação passiva, na qual o pesquisador, detentor do arcabouço teórico e das ferramentas apropriadas, investiga e interroga os informantes ou especialistas locais produzindo conhecimento e propondo soluções.

Os conhecimentos tradicionais assim como o conhecimento científico são dinâmicos e, portanto deve-se buscar compreender tanto seus acervos (ou conteúdos) transmitidos por gerações, quanto seus processos de investigação (ou sua forma) (CUNHA, 2007). No contexto da experiência intercultural, pautado na pesquisa colaborativa, foi fundamental entender o conhecimento Pataxó assim como os conhecimentos das disciplinas acadêmicas com as quais se dialogou, enquanto processos, modos de fazer e assim respeitar tanto o conteúdo quanto a forma desses conhecimentos.

O reconhecimento dos protocolos próprios de cada sistema de conhecimento e a reflexão sobre eles se deu com a promoção de debates sobre suas naturezas e seus resultados a cada etapa do trabalho (elaboração dos projetos de pesquisa, desenvolvimento das pesquisas, palestras e debates sobre temas e ferramentas). Por exemplo, ao se falar sobre mapas o grupo se questionou como os Pataxó mapeiam, como se localizam, como percebem o ambiente em que vivem e em que contexto esse conhecimento é utilizado, para quê e para quem. Quando o geógrafo fala sobre mapas, perguntou-se ao que ele está se referindo, como mapeia, o que isso diz sobre sua técnica e pressupostos sobre o ambiente e novamente em que contexto esse conhecimento é utilizado, para quê e para quem.

A equipe do COMBIOSERVE prezou ao longo de todo o trabalho pelo respeito à cosmovisão e ao conhecimento tradicional Pataxó em suas formas próprias de fazer pesquisa, deixando os participantes da experiência livres para escolher seus temas de pesquisa e conduzi-las de acordo com seus métodos. O que se configurou como uma busca dos mais jovens pelo conhecimento dos anciãos da comunidade, que não raro era transmitido em movimento, ou seja, através de caminhadas pelo território. Por outro lado, o respeito e a valorização dos modos de fazer Pataxó não implicaram em negligenciar o conhecimento científico, nem negar sua hegemonia na sociedade mundial contemporânea. Ao contrário, refletiu-se, nas devidas proporções, sobre o conhecimento científico, seus métodos e produção de resultados, ampliando o acesso dos indígenas a essa linguagem e possibilitando que experimentassem coletivamente diversas ferramentas, avaliando seus alcances e limites.

A experiência suscitou muitas questões dentre as quais se podem destacar algumas como: De que maneira podemos aprender e contemplar as diversas pedagogias que se
encontram? Como escolher a maneira mais adequada de registrar os resultados das pesquisas indígenas sem diminuir a importância do conhecimento tradicional frente ao conhecimento científico, uma vez que a escrita não é a forma privilegiada de produção e transmissão do primeiro, mas sim a oralidade e a convivência? Como traduzir um conhecimento pautado em percepções, tais quais os conhecimentos tradicionais, para pessoas que vem de uma tradição de conhecimento pautado em conceitos (os pesquisadores acadêmicos)? Como fomentar espaços educativos que escapem à hegemonia do conhecimento científico? Um dos maiores desafios nesse processo foi justamente a criação das condições de espaço, tempo e linguagem capazes de propiciar um ambiente onde a simetria entre o conhecimento acadêmico científico e o conhecimento tradicional indígena fosse experimentada na prática.

O que é e como foi a Experiência de Diálogo Intercultural com Pesquisadores Indígenas em Gestão Etnoambiental de Territórios Pataxó

Como expressado anteriormente, a Experiência de Diálogo Intercultural parte do princípio de que tanto o conhecimento científico quanto o conhecimento Pataxó são igualmente válidos e valiosos, considerados cada um em seu contexto e compreendidos em sua totalidade. Por isso, buscamos aprender o conteúdo e a forma do conhecimento tradicional ao invés de ajustá-lo aos protocolos pré-estabelecidos do conhecimento científico. Por exemplo, ao invés de ensinar aos Pataxós uma metodologia de avaliação da qualidade da mata, procuramos antes entender quais são seus meios de fazer tal avaliação, apresentando nossos meios, o método científico, o que possibilitou um debate aberto sobre diferentes formas de conceber, classificar e avaliar o mundo.

Buscamos propor um método que fosse participativo ou co-investigativo do início ao fim, considerando-se os passos básicos de desenvolvimento de uma pesquisa, desde o estabelecimento de hipóteses e definição de conceitos, passando pelos métodos e ferramentas, análise de dados e apresentação dos resultados. Uma vez que a pesquisa é central nesse processo, ao longo do programa de formação os participantes trabalharam em grupos desenvolvendo pesquisas sobre temas de seus interesses. As atividades teóricas e práticas foram pensadas de acordo com os temas dos grupos de pesquisa e com o escopo da experiência: a gestão ambiental dos territórios Pataxó.

Durante o período da experiência tratamos de realizar as atividades de forma a não prejudicar as atividades cotidianas das aldeias e dos participantes. Pelo contrário, esperamos que as pesquisas e que a dinâmica do curso contribuíssem para o engajamento das pessoas em projetos de gestão de seus territórios e do ambiente em que vivem.

Adotamos a pedagogia da alternância para proporcionar momentos de encontro de toda a turma na Reserva da Jaqueira (Terra Indígena Coroa Vermelha, Porto Seguro/ BA), intercalados por períodos em que cada grupo, em sua casa ou comunidade, se dedicava ao desenvolvimento da sua pesquisa. Assim construímos um calendário, de forma articulada com as lideranças das aldeias e os participantes, que se estruturou em dois tempos: o Tempo Oficina e o Tempo Aldeia (Figura 2).

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9A pedagogia da Alternância foi criada na França, em 1935, no Maisons Rurales Familiales que surgiu com o objetivo de atender às necessidades dos jovens agricultores nas zonas rurais. No Brasil, a experiência pioneira foi Escola Família Agrícola (EFA) em 1969. A EFA é uma associação que emprega a pedagogia da alternância na educação de jovens agricultores, enquanto contribui para o desenvolvimento local sustentável.
As oficinas (Figura 2) visaram reunir todos os pesquisadores para criarem e aperfeiçoarem seus projetos, refletirem questões pertinentes ao mesmo e aprenderem sobre temas específicos com professores indígenas e não indígenas. Nas oficinas foram oferecidas aulas expositivas, promovemos debates e trocas de experiências e utilizamos ferramentas de Diagnóstico Rápido Participativo\(^{10}\) para a construção de conhecimento em coletividade, com ênfase em métodos de mapeamento participativo.

O período entre uma oficina e outra, o tempo aldeia, era destinado a pôr em prática exercícios e atividades elencadas no tempo oficina. Depois de cada oficina, os grupos eram orientados para trabalhar nos seus projetos de pesquisa entrevistando, mapeando, fotografando, lendo, pintando etc.

O mapeamento participativo entrou nesse processo como ferramenta de diálogo intercultural sobre o território indígena Pataxó, utilizando-se os princípios de co-investigação e educação através da pesquisa. A produção coletiva de mapas nos permitiu localizar e definir ambientes, conflitos, histórias, moradias, limites, áreas de caça, áreas de retirada de madeira, áreas de atuação da \textit{Katumbayá}, trilhas antigas e recentes, cursos d’água e qualidade dos mesmos, além de vários outros aspectos geográficos do território e seus significados.

O uso de equipamentos audiovisuais também foi central no registro das pesquisas mostrando-se uma alternativa a pouca intimidade dos Pataxós com a linguagem escrita e a rica tradição em oralidade. O registro audiovisual também foi apresentado como ferramenta potencial de comunicação quando associado ao uso da internet.

Por isso, os participantes tiveram aulas de cartografia, treinamento no uso do GPS e produção de mapas, e aprenderam a manusear máquinas fotográficas, gravadores de áudio, a fazer filmagens, construir blogs na internet, usar o Google Earth e publicar fotos e vídeos em redes sociais.

Os grupos de pesquisadores indígenas contaram com quatro orientadores para realizar seus projetos de pesquisa, dois deles indígenas, sendo um da Reserva da Jaqueira e outro da aldeia Pé do Monte e dois deles não indígenas, integrantes da equipe do COMBIOSERVE.

\(^{10}\) Diagnóstico Rápido Participativo (DRP) (CHAMBERS, 1983; 1994).
A Experiência de Diálogo Intercultural com Pesquisadores Indígenas em Gestão Etnoambiental de Territórios Pataxó foi conduzida pelos orientadores em colaboração com pesquisadores de diferentes instituições das áreas de antropologia, ciências políticas, geografia e ecologia; anciões, lideranças e jovens indígenas que contribuíram com palestras e compartilhamento de ferramentas de pesquisa e reflexão coletiva. Uma vez que os pesquisadores do COMBIOSERVE de outros países e mesmo do Brasil também tinham seus próprios temas de pesquisa, a cada oficina alguns deles eram convidados a compartilhar seus modos de fazer a pesquisa (as ferramentas utilizadas) e também os resultados encontrados.

Ao longo dos dois anos da experiência algumas pessoas tiveram que se retirar por razões pessoais e outras se integraram ao trabalho. Contado com essa flutuação na participação, a turma variou entre 10 e 30 pessoas ao longo de todo o trabalho, sendo que os líderes dos grupos, em geral permaneceram os mesmos do princípio ao fim. Outros grupos, com a evasão ou mudança dos integrantes para outros grupos, transformaram-se em trabalhos individuais.

Importante frisar que a experiência de diálogo intercultural não exigiu um letramento formal para qualificar os candidatos, mas sim interesse e histórico de atuação na temática e disponibilidade. A não exigência do letramento permite a participação de sábios e especialistas nativos que, apesar de não saberes ler e escrever são reconhecidos como conhecedores natos do território, do ambiente e da cultura Pataxó.

A experiência teve início em agosto de 2012 com conclusão em julho de 2014, período em que foram realizadas quatro oficinas e concluídas as pesquisas dos grupos de pesquisadores indígenas (Figuras 4 e 5).
Os grupos de pesquisadores indígenas
Ao final da experiência, os grupos de pesquisadores Pataxós sistematizaram a produção de suas pesquisas, cada um ao seu modo, produzindo uma coletânea de textos nos quais os pesquisadores indígenas compartilham com o leitor o que aprenderam ao longo da experiência, como fizeram suas pesquisas, quais desafios enfrentaram e que lições querem passar para seus parentes, para outros povos indígenas e para não indígenas. Essa coletânea de textos será utilizada como livro paradidático nas escolas indígenas e também no intercâmbio de experiências com outros povos.

Table 2: Relação dos grupos de pesquisadores indígenas

<table>
<thead>
<tr>
<th>Nome do grupo</th>
<th>Tema</th>
<th>Participantes</th>
<th>Comunidade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aripônã humakiamy</td>
<td>A História da “catumbaiá” e da “amesca”</td>
<td>Nayara, Kamayurá, Macaíba e Oiti</td>
<td>Coroa Vermelha</td>
</tr>
<tr>
<td>Siriatê Jikitayá</td>
<td>Fauna e flora da Reserva da Jaqueira</td>
<td>Nytinawã, Aderno, Jandaya, Akawã, Paulinho, Takuara e Suhriassũ</td>
<td>Coroa Vermelha</td>
</tr>
</tbody>
</table>

Figure 7: Grupos trabalhando durante as Oficinas
Figure 8: Grupos desenvolvendo suas pesquisas durante Tempo Comunidade
Considerações finais
Ademais de todo o aprendizado e troca de experiências, temos como resultado dessa experiência, ou o produto desse processo, uma coletânea de textos de autoria Pataxó sobre variados temas que retratam diferentes abordagens sobre a percepção Pataxó acerca da gestão ambiental dos seus territórios. A opção por apresentar os resultados das pesquisas realizadas ao longo da pesquisa pelos Pataxó em um livro tem um motivo de ser. Desde o início os participantes da experiência estiveram livres para escolherem a forma como iriam apresentar seus resultados, quer seja em vídeo, áudio, desenhos, peça teatral entre outros. A opção pelo registro escrito e em especial pela publicação de um livro de autoria Pataxó condiz com o desejo de falar com “os de fora”, de divulgar a cultura e o conhecimento para aqueles que valorizam o livro como forma privilegiada de registro e transmissão de informação. Agora, cientes dos limites deste modo de comunicação e tradução de saberes, os Pataxó afirmam que o texto apenas expressa um conteúdo parcial e não a forma em que se constrói e a globalidade de seus conhecimentos.

Os textos são apresentados nesse livro no formato de relato de experiência: um modo de registrar o que foi feito, dito, escutado, sentido e praticado, ou seja, o aprendido. Mais do que produzir ciência em colaboração, mais do que registrar e produzir conteúdos, temos aqui uma celebração à criação de espaços de diálogo onde se preza pela simetria na relação entre o conhecimento tradicional Pataxó e o conhecimento acadêmico científico (SANTOS & DIAS, 2010). Com essa publicação celebramos a valorização de outras formas de conhecer, outras formas de conceber a existência dos seres, o respeito aos anciões e às práticas e relações cotidianas, indo no sentido contrário da prática da Ciência que busca uma verdade universal. Podemos dizer que esta é a conclusão maior desta experiência.

Participatory biodiversity monitoring: Challenges and perspectives on participatory monitoring with Tsimane’ communities in the Biosphere Reserve and Community Territory of Pilon Lajas, Bolivia.

Introducción
El monitoreo participativo con comunidades tiene su origen en la fusión de la investigación-acción y la investigación participativa (Khanlou & Peter, 2005). La investigación-acción, se remonta a la década de 1940 por Kurt Lewin, quien había sostenido que era necesario un nuevo tipo de investigación para la transformación social. De tal forma, Lewin e investigadores, incluyen a miembros de la comunidad como co-socios en la investigación.

En este trabajo analizamos los retos y perspectivas del monitoreo participativo en el manejo y conservación de los recursos naturales con comunidades Tsimane’ en la Reserva de la biosfera y territorio comunitario de origen Pilón Lajas (RBTCOPL), Bolivia a partir de las experiencias del consorcio COMBIOSERVE.

La Reserva de la biosfera y territorio comunitario de origen Pilón Lajas
La Reserva de la Biosfera y Tierra Comunitaria de Origen Pilón Lajas, fue creada a inicios de la década de 1990 y tiene la característica de contar con el doble estado de Reserva de la Biosfera y Tierra Comunitaria de Origen (Peredo-Videa 2008). Está localizada a 350 km Noreste de la ciudad de La Paz y 50 km de San Borja (Beni) y cuenta con una superficie de 386,000 hectáreas. Se encuentra en las últimas estribaciones de los Andes, y comienzos de las Sabanas del Beni, ubicada entre las provincias Sud Yungas y Franz Tamayo del departamento de La Paz y en la provincia General José Ballivián del departamento del Beni. Colinda al norte y este con el camino Yucumo-Rurrenabaque; al oeste con el río Beni y al suroeste con el Territorio Comunitario de Origen Mosetene y el tramo carretero entre La Paz y Yucumo (Fig. 1). El área protegida se sobrepone con los municipios de Rurrenabaque, San Borja, Palos Blancos y Apolo. Las coordenadas geográficas en las que se encuentra la reserva (punto central) son: -67°21 Oeste y -14°57’Sur (Peredo-Videa 2008; SERNAP 2009).

La región montañosa de la reserva, llega hasta los 2000 msnm la cual rodea el amplio valle aluvial del rio Quiquibey. La reserva cuenta con una gran biodiversidad debido a la gran variedad de ecosistemas entre los cuales se encuentra los bosques lluviosos sub Andinos, bosques pluviales de pie de monte, bosques estacionales húmedos, bosques riparios y zonas pantanosas (Ribera 1999). Una estimación indica que la zona de la reserva cuenta con la más alta diversidad florística del Beni aproximada mente 2.000 a 3.000 especies de plantas vasculares (Killeen, 1993).

Comunidades Tsimane’
Las comunidades Tsimane’, juntos con los Tacanas y Mosetenes, son tres etnias que habitan la RBTCOPL. Dentro de la reserva, las comunidades indígenas se ubican...
principalmente en la zona piedemontaña, cerca de la carretera, y en la orilla de los ríos Beni. Las actividades se centran en pesca, cacería y agricultura, todos ellos de forma tradicional y para el autoconsumo. En ciertos asentamientos en el río Quiquibey, las comunidades explotan la jatata (*Geonoma deversa*) para construcción de techos (también comercializan para la autosubsistencia que es complementario a su economía).

Debido a la influencia de la carretera en el límite Este de la reserva, muchos indígenas han dejado el trabajo en la comunidad y van a trabajar a los chacos de campesinos migrantes o colonos, cuya población es por encima de los 10 000 (INE 2013). En su mayoría originarios del altiplano, estos campesinos migrantes llegaron inicialmente entre 1978 y 1980 con la iniciación de la construcción del camino Yucumo-Rurrenabaque, y posteriormente otro grupo de migrantes llega entre 1983 y 1987, después de la nacionalización y cierre de minas del estado en su gran mayoría del altiplano.

La TCO es representada por el Consejo Regional Tsimane y Mosetene (CRTM). El consejo tiene el fin de poder representar y defender a las diferentes comunidades indígenas de la reserva, velar por sus intereses y actuar como un representante legal ante las autoridades gubernamentales. Es de esa forma que el CRTM es parte de la CIDOB (Confederación de Pueblos Indígenas de Bolivia) y a la Central de Pueblos Indígenas del Beni (CPIB).

**Comunidades en las que se ha desarrollado el Proyecto**

Las comunidades con las que se ha trabajado son San Luis Chico y Alto Colorado.

*San Luis Chico.* se encuentra en el centro de la reserva a orillas del río Quiquibey a 8 horas por bote desde Rurrenabaque. Tiene una población reducida de 23 familias y como principales actividades económicas están la producción de cacao nativo y el tejido de jatata para los techos. Adicionalmente, pero más para consumo interno, los comunarios de San Luis cazan, pescan y recolectan frutos de los bosques los cuales son los más intactos de toda la reserva.

*Alto Colorado.* se encuentra en el límite Este de la reserva a 20 minutos de la carretera Rurrenabaque-Yucumo (en automóvil). La población está constituida por 46 familias y el acceso a la carretera ha disminuido sus actividades de cacería y/o pesca y son más dependientes de los trabajos eventuales que puedan proveer colonos vecinos. A pesar de la fuerte influencia externa, las mujeres aun recolectan frutos de los bosques, pero esta actividad es cada vez menor.

**Monitoreo participativo**

Para el desarrollo del monitoreo participativo en ambas comunidades se basó en el ciclo de indagación (Feinsinger, 2003) el cual consiste en tres pasos: Pregunta, acción y reflexión. Se realizaron talleres en ambas comunidades, los cuales tuvieron el objetivo de identificar conjuntamente elementos importantes para la conservación y monitoreo y plantear la pregunta central para la investigación. En esta etapa del ciclo de indagación, y para poder ver el conocimiento local y que éste sirva como base para la discusión y definir la pregunta, se elaboraron los siguientes mapas parlantes.
1. **Mapa base o de espacio.** Los límites de la comunidad son dibujados y se identifican los elementos que componen el paisaje actual (se puede indicar las unidades de paisaje).

2. **Mapa de Usos.** Utilizando el mapa 1 como base, se sobrepone una hoja de papel mantequilla y se dibuja el mapa de usos. En esta segunda capa, se identifican unidades de manejo donde se llevan a cabo una serie de actividades específicas.

3. **Mapa de Iniciativas y/o proyectos.** Una vez que los conceptos sobre Iniciativas y Proyectos son aclarados se incluye una nueva hoja sobre las capas anteriores (espacio y uso) y se identifican las Iniciativas/proyectos existentes. En esta hoja en blanco sobrepuesta se dibujaron los proyectos o iniciativas importantes que se tienen en general e identificando aquellas relacionadas con la conservación, como pueden ser áreas de conservación, área de manejo forestal, zona con árboles semilleros, área donde se restringe la caza, área de reforestación, etc. También se identificarán las instituciones (si las hay) que han apoyado los proyectos o iniciativas.

4. **Mapa de biodiversidad.** Para la construcción de este mapa, se hizo uso de cartillas con fotografías y nombres en Tsimane' de mamíferos que podrían habitar la zona. Sobre una nueva hoja, se van marcando con números los sitios donde las especies fueron observadas. Con referencia a la diversidad de plantas, estas fueron dibujadas (y descritas) de acuerdo al uso que representan.
Figure 9: Mapa de la Reserva de la Biosfera y Territorio Comunitario de Origen Pilón Lajas, y la localización de las comunidades de San Luis Chico y Alto Colorado.

Después de la elaboración de los mapas éstos sirvieron para crear una lista de necesidades e inquietudes, con los que se identificaron los temas de investigación conjunta. En San Luis Chico: Reforestación con especies nativas y pesquería; y Alto Colorado: Mapeo comunitario y plantas medicinales.
Para cada tema de investigación, se determinaron las acciones (segundo paso del ciclo de indagación), que los investigadores e investigadores-comunitarios que se llevarían a cabo a manera de responder la pregunta original.

**Reforestación.**
El tema de reforestación nace a partir de experiencias de la comunidad en la utilización de especies nativas para proveer sombra a cultivos de cacao. Se seleccionó trabajar con Mara (*Swietenia macrophylla)*.

La metodología empleada para la co-investigacion fue la siguiente. (1) Reconocimiento de arboles semilleros (2) Seguimiento fenológico (3) Recolección de semillas (4) Control de la germinación. (5) Plantación y finalmente (6) Monitoreo. Después de un trabajo de aproximadamente 10 meses, se recolectaron y plantaron 684 semillas. Sin embargo, hasta la culminación del proyecto, solo 200 plantines fueron transferidos a diferentes sitios. De los restantes 484 plantines, un porcentaje fueron inviables, otras fueron arrasadas por las inundaciones.

**Pesca**
El proyecto de pesca, se originó ante la preocupación de los comunarios sobre la variación en la cantidad de peces extraídos del río Quiquibey durante los últimos años. Los co-investigadores, hicieron entrevistas semanales a los miembros de la comunidad que pescaron durante esos días y dicha información fue incluida en formularios. Fueron alrededor de 14 especies de peces que colectaron las familias a lo largo de todo el año de estudio. La mayor diversidad de peces se las encuentra los meses cuando el nivel del agua del río aumenta, aunque algunas especies más bien se las encuentra cuando el nivel del agua es baja.

En la época que baja el nivel del agua del río que dura a partir del mes de mayo hasta octubre, las familias salen a pescar al menos una vez a la semana y algunas veces se quedan a dormir si van a sitios muy alejados. Las familias utilizan para la pesca también flecha, red y anzuelos y cuando disminuye la cantidad de agua en el río, alguna vez también utilizan el barbasco (la pesca con barbasco es un arte tradicional que utiliza ictiotóxicos de origen vegetal y se complementa con arco y flecha). Cuando el nivel del agua es alta (enero, febrero, marzo) las familias pueden pescar con redes.

**Mapeo comunitario**
Alto Colorado: El proceso de discusión sobre necesidades para la comunidad, se originó con cuestionamientos sobre límites de la comunidad, localización de los recursos y chacos. Es de esta manera, que se conforma un grupo de investigadores y el proceso se inicia con la capacitación sobre el uso de un GPS y lineamientos básicos en el uso de esta herramienta. Posteriormente, los investigadores comunitarios, realizan caminatas por su comunidad (límites y chacos), y colectan puntos en GPS. Utilizando los datos que los investigadores comunitarios recolectaron durante los 10 meses de colecta, se construyó un mapa de área acción, la cual incluye una vasta área que incluye ríos y lagunas que inicialmente no fueron incluidas en los mapas orales de la comunidad. También se elaboraron mapas orales, que muestran la percepción que tienen de su área de ocupación.
**Plantas medicinales**
El estudio de las plantas medicinales fue una inquietud general de la comunidad de Alto Colorado, ya que ellos utilizan muchas especies de plantas para diversas enfermedades y problemas de salud que tienen. Un equipo de 4 investigadores locales realizaron el levantamiento de la información mediante encuestas (a personas que utilizan, conocen y curan las enfermedades) y la recolección de estas plantas. Los resultados mostraron que la medicina tradicional practicada no se limita a curar sino ayuda a prevenir enfermedades del cuerpo, enfermedades del alma, e incluso la falta de habilidades, en el caso de los varones habilidades para ser buen cazador o pescador, y en el caso de las mujeres habilidades para ser buenas tejedoras o amas de casa. Hay 157 plantas medicinales que fueron agrupados en 10 categorías de uso. Las enfermedades tratadas con plantas medicinales más comunes son abscesos “puchichi”, carcha, diarrea, dolor de estómago, dolor de cabeza, espundia, gripe. Las plantas mencionadas en esta investigación fueron recolectadas en diferentes sitios como monte (bosque), barbechos, alrededor de sus casas, bosque chaqueado, curichales .Hay medicina para curar enfermedades causadas por seres espirituales como las enfermedades “causa jichi” o también son las llamadas enfermedades mágicas.

**Los retos de la investigación conjunta**
En el presente trabajo, la participación de los investigadores inicialmente fue significativa y constante. Pero a medida que el tiempo transcurrió, esta disminuyó, incluso algunos investigadores comunitarios tuvieron que dejar de trabajar para completar otros trabajos que les pueda proveer remuneración económica. Este tema es el más complejo, ya que los temas de investigación requieren tiempo, y en varios casos se busca una remuneración económica.

También se ha visto que es extremadamente importante estar con la comunidad la mayor cantidad de tiempo, no solo para resolver dudas y también para poder tener una mejor visión de la vida en la comunidad. El tiempo de trabajo conjunto es clave e importante, ya que en el día a día surgen más preguntas y también se resuelven más problemas de manera conjunta. El proceso involucra un diálogo que concede un rol activo a la comunidad, estimula su participación en el diagnostico y resolución de sus necesidades. Para este proceso se ha observado que se requieren condiciones en la comunidad y a la vez se lleva a la comunidad a enfrentar desafíos como:

- El contexto actual en el que vive el país revela una falta de investigación, la balanza del financiamiento se inclina desproporcionalmente a favor de la acción, en desmedro del conocimiento y de lo que “ocurre” (tanto desde el punto de vista de la investigación pura como aplicada).

- Persiste la idea de una investigación aplicada, pasando de lado los temas básicos a partir de los cuales se debe hacer los temas aplicados que en muchos de los casos, en las comunidades los temas realizados los deja en un proceso incompleto donde la comunidad no sabe como continuar y carece de los mecanismos para hacer que estos temas sean productivos para ellos, como por ejemplo el tema del cacao.
• Se advierte desconfianza de las comunidades, cansadas de muchos estudios y proyectos realizados en sus territorios y de los cuales no conocen resultados, por lo que en varios casos, los mismos temas de investigación son propuestos otra vez para su realización.

Hay un contexto nuevo para la investigación con comunidades, se requiere:

• Fomentar la participación activa y responsable de la comunidad
• Colaborar con otros grupos de trabajo existente que potencien la investigación como una ONG y una institución científica.
• Permitir a la comunidad tomar decisiones sobre los temas investigativos.

Hay relevancia de la participación comunal en la investigación, por el vínculo que se genera con los procesos de cambio social. Si la comunidad se involucra activamente, y desde el comienzo, en el proceso de desarrollo de la intervención, la participación se convierte en un proceso dinámico y dual de toma de conciencia de la situación o problemática existente y de sus causas, así como de las acciones que pueden conducir a la superación de la situación, con un cambio del rol de la comunidad como protagonista en dirección de la intervención y consiguiente toma de conciencia.

Methodological innovations in assessing the effectiveness of community-based conservation

Participatory scenario-building methodologies for resilience
Contribution by the Universitat Autónoma Barcelona
Authors: Isabel Ruiz-Mallén, Esteve Corbera, Victoria Reyes-García, Diana Calvo-Boyero, Martí Burriel, and Katrina Brown

Resilience research is concerned with the study of the dynamics of social-ecological systems in a context of global environmental change (Folke 2006). It is interested in understanding people’s adaptive capacity, i.e. their ability to adjust to changing circumstances. We present a participatory methodology to explore how individual and collective adaptive capacity and social-ecological resilience might change in relation to different future climate, socio-economic, and policy scenarios. The methodology can potentially be used in biodiversity conservation contexts where local people hold or share decision-making power over natural resource management.

Scenarios are reasonable descriptions of hypothetical futures designed on the basis of a set of factors and dynamics that characterize a reality (van Notten 2005). They are not predictions, but tools to search potential implications of policies and actions. Thus, they can help to explore the future at multiple scales. Scenarios are often developed by scientists on the basis of large data sets and dynamic projections of ecosystems and societies, but they can also be co-developed between scientists, civil society organisations...
and lay people through a process of joint data collection, analysis and deliberation. Such scenarios, typically named bottom-up or participatory, aim to discuss the future in concrete settings, for instance in a given territory or community, as they are developed to understand ongoing and plausible ecological and social dynamics drawing on both scientific and local ecological knowledge, including local people perceptions and understandings. Bottom-up, participatory scenarios also aim to engage local people in thinking about and acting upon their own future (Ruiz-Mallén et al., 2014).

We have drawn on earlier work on participatory scenario development (e.g. Malinga et al, 2013; Tompkins et al. 2008) to design a new approach termed 'Bottom-Up Scenario-Building Exercises' (BUSBE), which we have tested in selected rural and indigenous communities in Mexico and Bolivia (Ruiz-Mallén et al., forthcoming). The BUSBE method consists of five key consecutive steps, namely: 1) stakeholders identification; 2) participatory development of realistic future scenarios (scenario-building workshop); 3) expert-led generation of storylines; 4) identification of household typologies according to vulnerability perceptions; and 5) community-based deliberative focus groups to discuss adaptation or maladaptation strategies in the previously defined storylines. Our approach is designed to include local knowledge and views on the local environment in scenario development with the aim of enriching the scientific understanding of the system. Because it partially draws in local knowledge, the approach also helps on a situation in which there is a lack of quantitative data on ecological and social dynamics, a challenge that typically researchers face in developing countries.

During this workshop we will do a role-playing game. Workshop participants will assume the role of stakeholders who attend the scenario-building workshop in one of the COMBIOSERVE selected sites (BUSBE step 2). Such stakeholders are local and regional individual actors, organizations and institutions belonging to government, NGOs, and civil society that can influence natural resource management and conservation in the selected site. We will give workshop participants a card with information on the stakeholder that s/he is supposed to represent. They will participate in a workshop for outlining 4 plausible scenarios of socio-economic and environmental change at regional level (likely futures), relevant to the selected site and spanning two decades. They will follow the same methodology that we used in Mexico and Bolivia as part of the COMBIOSERVE project as a way of "learning by doing".

The starting point of the game will be a set of drivers of change identified by local informants in each site. For instance, in the Bolivian case, locally perceived drivers of change included: rainfall variability, the colonization process, conservation regulations, and infrastructure development. Participants will select two drivers of change, which in turn will form the basis for developing 4 plausible scenarios distinguished by varying degrees of drivers’ intensity (see Matrix below).

YEAR 2030

<table>
<thead>
<tr>
<th>Driver of change 1 as intense as it is now (=)</th>
<th>Driver of change 1 more intense than it is now (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver of change 2 as intense as it is now (=)</td>
<td>Driver of change 2 more intense than it is now (+)</td>
</tr>
</tbody>
</table>
Participants will participate in a guided discussion on the potential impacts of such drivers on household and collective assets, according to the fictional character’s experience and perceptions they represented. The goal would be to try to achieve a consensus around how the future would be under such drivers and degrees of intensity. By designing the scenarios through a multi-stakeholder workshop, we will show participants that it is possible to capture all the range of institutional views regarding the most consistent and logic futures. We will also discuss the methodological challenges we identified when implemented it in communities in Bolivia and Mexico (i.e., personnel and technical resources, participants attendance, data collection, conflict resolution, among others).

Choice experiments

Contribution by the Institute for Environmental Studies of the Vrije Universiteit Amsterdam
Author: Mark J. Koetse

This method does not belong to the participatory or co-enquiry methods toolbox. We include it in this manual as it constitutes a methodological innovation for assessing the effectiveness of community-based conservation. In the context of COMBIOSERVE, it was implemented as part of Work Package 4 on ‘Conditions and threats for community-based management’.

The choice experiment method can be used to estimate economic values for virtually any ecosystem good or service. It is also a hypothetical method – it asks people to make choices based on a hypothetical scenario. The method is based on the idea that any good can be described in terms of its attributes or characteristics. Changes in the level of these attributes essentially result in a different good, and the method aims at deriving the values of such changes. Values are inferred from the hypothetical choices or tradeoffs that people make between different combinations of attributes. In choice experiments respondents are asked to select their preferred option from a set of choice options, rather than asking directly for values (as is common in a valuation method called contingent valuation). The calculation of monetary values from the choice experiment results is made possible by including a so-called payment vehicle (e.g., price of the good) as one of the attributes or characteristics.

Because the choice experiment method focuses on tradeoffs among alternatives with different characteristics, it is especially suited to policy decisions where a set of possible actions might result in different impacts on ecosystem services. For example, a restored wetland will improve the quality of several services, such as floodwater storage, drinking water supply, on-site recreation, and biodiversity. The basic steps in implementing a choice experiment are:
- Define the valuation problem: This includes defining which ecosystem services are to be valued and what the relevant population is.
- Design the survey: This involves a number of steps including deciding what type of survey will be used (internet, telephone, face to face), determining the choice characteristics, and choosing the payment vehicle (the monetary attribute).
- Pre-testing: Ideally, focus groups followed by pre-testing should be used to set and test the levels of the choice attributes used. Results from the pre-test can also be used to obtain more efficient choice cards (i.e., choice cards that include choices with more interesting trade-offs).
- Implement the survey: This includes selecting the survey sample, in many cases be a random sample from the relevant population.
- Analyse the results: This requires the use of statistical analysis and specifically choice models to infer values from the tradeoffs and choices made by respondents. The average value for each of the attributes is estimated is extrapolated to the relevant population in order to calculate a total value for the ecosystem service under investigation.

A clear advantage of the choice experiment method is that it is an efficient means of collecting information, since choice tasks require respondents to evaluate choice options that contain various attributes simultaneously. In addition, economic value estimates are not obtained by directly asking people for these values, but instead are inferred from the trade-offs respondents make between monetary and non-monetary attributes. As such they mimic actual choice behaviour more closely. A further advantage of the choice experiment approach is that research is not limited by pre-existing market conditions, since the levels used in a choice experiment can be set to any reasonable range of values. As such, the choice modelling is useful to use as a policy tool for exploring proposed or hypothetical futures or options. For example, the choice experiment implemented in the COMBIOSERVE field site of Calakmul in Mexico is used to assess people's preferences for possible future contracts aimed at resource use restrictions and reforestation. It contained choices with the following five choice attributes:

1. Land use restrictions: No restriction in the no contract option, Full restrictions in the contract options;
2. Degree of reforestation: Levels of 0%, 30%, 60%;
3. Monetary compensation: Levels of 250, 500, 1000 and 2000 Pesos per hectare per year;
4. Contract duration: Levels of 2, 5 and 10 years;
5. Allocation of compensation: Levels were 100% landowner / 0% community, 75% landowner / 25% community, and 50% landowner / 50% community).
In order to obtain information on a range of possible choices we distinguished between 36 different choice cards, which were divided over 6 different versions. This implies that each respondent was shown (36/6=) 6 different choice cards. Each choice card contained three alternatives, i.e., a status quo alternative with no land use restrictions, no reforestation and no monetary compensation, and two alternatives with full land use restrictions and varying amounts of reforestation, contract duration, monetary compensation and allocation of the compensation between private and public sources. In each choice card the landowner was asked to indicate which choice alternative he or she prefers. An example of a choice card as it was presented to respondents is shown below in Figure 10: Example of a choice card as presented to respondents.

<table>
<thead>
<tr>
<th>Contract 1: You are not allowed to cut down trees on your land</th>
<th>Contract 2: You are not allowed to cut down trees on your land</th>
<th>Current situation (no contract)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The part of your land that will be used for reforestation</strong></td>
<td><strong>The part of your land that will be used for reforestation</strong></td>
<td><strong>Current situation:</strong></td>
</tr>
<tr>
<td>60% of your land</td>
<td>0% of your land</td>
<td>• No contract</td>
</tr>
<tr>
<td><img src="image1.png" alt="Image of 60% of land" /></td>
<td><img src="image2.png" alt="Image of 0% of land" /></td>
<td>• You are allowed to cut down trees on your land</td>
</tr>
<tr>
<td><strong>Monetary compensation</strong></td>
<td><strong>Monetary compensation</strong></td>
<td>• Your land will not be used for reforestation</td>
</tr>
<tr>
<td>2000 pesos per hectare per year</td>
<td>250 pesos per hectare per year</td>
<td>• You will not receive an annual monetary compensation</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image of 2000 pesos" /></td>
<td><img src="image4.png" alt="Image of 250 pesos" /></td>
<td><img src="image5.png" alt="Image of 50 pesos" /></td>
</tr>
<tr>
<td><strong>Duration of the contract</strong></td>
<td><strong>Duration of the contract</strong></td>
<td><img src="image6.png" alt="Image of 2015-2017" /></td>
</tr>
<tr>
<td><strong>Allocation of compensation</strong></td>
<td><strong>Allocation of compensation</strong></td>
<td><img src="image8.png" alt="Image of allocation" /></td>
</tr>
<tr>
<td>Landowner 100%</td>
<td>Landowner 75%</td>
<td>Community 0%</td>
</tr>
<tr>
<td>Community 0%</td>
<td>Community 25%</td>
<td><img src="image9.png" alt="Image of community" /></td>
</tr>
</tbody>
</table>

Figure 10: Example of a choice card as presented to respondents.
A choice model was estimated on the data obtained, and value estimates were derived from the estimated coefficients as the marginal rate of substitution between a unit change in a non-monetary attribute and a unit change in the monetary attribute (in this case monetary compensation per hectare per year). For example, the monetary compensation required for a full restriction of resources ($RS$) is given by:

$$\text{Monetary compensation} (RS) = -\frac{\beta_{RS}}{\beta_{MC}}$$

Results show that compensations needed for resource use restrictions and low levels (30%) of reforestation are limited, that substantial compensations would be needed for large levels (60%) of reforestation. Also the findings show that people strongly prefer longer to shorter contracts (i.e., they prefer a lower but steady stream of money income), and that landowners very much dislike allocating part of the compensation received to the community (see COMBIOSERVE Deliverable 4.3 for more details).
V. Protocols for co-enquiry research

Background
One of the principal aims of COMBIOSERVE was to develop a set of practical, adaptable and replicable tools for implementing co-enquiry as a preferred approach when carrying out research on the effectiveness of community-based natural resource management. The Co-enquiry Research Protocols (CRPs) presented in this section are comprehensive tools for researchers to explore and adapt to different realities all over Latin America and beyond. CRPs were developed both for carrying out biodiversity monitoring and social science research.

Monitoring of biodiversity and community-based management of natural resources:

(1) Community-based plant monitoring. This protocol provides an adaptable research protocol for the implementation of a co-enquiry methodological approach for plant monitoring for community-based natural resource management.

(2) Community-based fauna monitoring. This protocol provides an adaptable research protocol for the implementation of a co-enquiry methodological approach for elements of wildlife monitoring for community-based natural resource management.

(3) Community-based river monitoring. This succinct protocol provides an adaptable research protocol for the implementation of a co-enquiry methodological approach for elements of river monitoring for community-based natural resource management.

(4) Community-based reforestation monitoring. This succinct protocol provides an adaptable research protocol for the implementation of a co-enquiry methodological approach for elements of reforestation monitoring for community-based natural resource management.

Social science research on socio-environmental change:

(5) Basic social science research methods in co-enquiry: workshops, semi-structured interviews, oral histories, focus groups and participatory mapping: This protocol provides an adaptable research protocol for the implementation of a co-enquiry methodological approach for elements of social science research in the context of community-based natural resource management.

(6) Innovative approaches: the System Operator of TRIZ-OSTM and problematising dialogues. This protocol provides an adaptable research protocol for the implementation of a co-enquiry methodological approach for exploring current realities and change in community contexts.

The protocols on river and reforestation monitoring were developed in the Pilon Lajas fieldsite and therefore represent the requirements and processes developed in Tsimae communities. All other protocols were developed in the Chinantla field-site; as such, the protocols were developed with Chinantec community researchers to respond to their communities’ necessities and interests. Nevertheless, communities, CSOs and research institutions operating at other COMBIOSERVE fieldsites provided significant input into
the design of the methodological process. Although the CRPs were developed within specific social, political, cultural and environmental conditions, the approaches provided can be adapted to a variety of different conditions.

These CRPs were developed in order to provide tools for implementing a co-enquiry approach in the assessment of community-based management of biocultural diversity. Their ultimate aim is to act as tools for adaptive management, with an emphasis on community priorities and aspirations for their community-conserved areas and natural resource management systems.

It is expected they will help researchers and communities in many different contexts work together to empower communities to manage their biocultural diversity autonomously, effectively, and adaptively. The protocol is aimed at researchers or research facilitators wishing to adopt a co-enquiry approach in their work with communities. It might also be a source of information for community leaders who wish to engage in co-enquiry with research institutions.

Chapters II and III provide a literature review and the theoretical context and framework for co-enquiry as well as practical guidance for establishing and maintaining a co-enquiry process.

**Designing a co-enquiry research process: key concepts**

The approach enshrined in these CRPs is one that seeks to carry out interactive participatory research – called co-enquiry – that places the research process in the hands of the community (see Table of Typologies of participation in Annex 3). Some central concepts upon which the Chinantla co-enquiry processes were built are:

1. The community hosting the research (hereafter 'host community') collectively decide upon a research need and seek support of the external researchers, whose role is to act as research facilitators (hereafter ‘facilitators’);
2. Through a locally appropriate and/or democratic process, the host community elects a team of community researchers. Together, facilitators and community researchers constitute the research team;
3. Community researchers, in continuous collaboration and communication with community decision-making bodies, are the primary leaders of the research process, including the development of research questions; assessment, adaptation and implementation of methods in the field; data analysis; and dissemination of the results;
4. Facilitators provide training, technical guidance and financial support for community researchers and the community at large;
5. Given communities' changing research needs and lack of formal education, conventional scientific research methodologies can often provide useful starting points for developing co-enquiry approaches to answering their questions.

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11 Please refer to Chapter III for further information and guidance regarding the election of community researchers
12 We have chosen the term ‘conventional’ because we believe that indigenous modes of knowledge are also scientific, even though they are not conventional.
However, the co-enquiry framing ensures that these methodologies are questioned, analysed and adapted to local contexts.

6. The Code of Ethics of the International Society for Ethnobiology (ISE; see Annex 1) is used as the primary reference for ethical research (for both social and natural sciences), although co-enquiry seeks to go beyond these high standards;

7. In line with the Code of Ethics of the ISE, communities and community researchers can, at any moment during the research cycle, request that the research process be adapted, modified, re-framed, or even suspended;

8. The process for developing a complete CRP – that provides methodological tools and adaptations for tackling every element of the research cycle – is inherently long (taking up to 2 years), especially in the context of communities who have a low level of formal education.

9. Given that this protocol aims to be adaptable, the authors provide throughout – in the shape of yellow-shaded boxes entitled ‘Adaptations’ – examples of adaptations implemented in the social context of Chinantec and Tsimane’ communities. It is hoped that this will give readers ideas for adaptation in the social context they are working in.

**Developing a co-enquiry methodology**

Global Diversity Foundation, the primary institution responsible for developing the protocols and this Methods Manual, has a long-term reciprocal and collaborative relationship with community researchers and community members in the Chinantla. This has enabled us to develop, in collaboration with community researchers, a locally tailored co-enquiry methodology. Chapters II and III cover the theoretical and practical aspects of developing such a methodology. In the case of the Tsimane’ communities, where CRPs on reforestation monitoring and fishing monitoring were developed, a full co-enquiry approach was difficult to develop due to the lack of formal education among community researchers. Therefore, some aspects of these latter CRPs, rather than representing a full co-enquiry approach, were developed using a collaborative approach led by an external researcher.

Ideally, and usually after many years of practice and reflection, co-enquiry encourages community researchers to develop *sui generis* research methods or to identify traditional methods that help to answer their research questions, in practice conventional social science research are used as a basis for the development of community-based approaches and adaptations. In the Chinantla context, researchers preferred learning conventional science methods that they question, test and adapt to their own realities, abilities and research questions. This highly productive work of adapting conventional methods to a co-enquiry approach is a necessary part of our collaborative work in COMBIOSERVE: as such, the Chinantec research teams adapted a selection of the methods proposed by two project research institutions (UAB for the CRP on Basic Social Science research methods and INECOL for the CRPs on biodiversity monitoring), and developed others that they felt would be useful, especially for CRP on Innovative approaches.

Over the course of 6 years of ethnographic, co-enquiry and community planning fieldwork with GDF, Chinantla community researchers have developed numerous research questions that are based on their local research needs and aspirations. The specific research questions included in this protocol are those Chinantec research
questions that coincide with the objectives of COMBIOSERVE research. It is particularly important that the whole community develop research questions together, as this integrates the co-enquiry process into community decision-making processes rather than isolating it as a parallel process that is only fully known to the team of community researchers. The protocol for developing co-enquiry research questions is described in Chapter III.

Developing a research calendar

Each co-enquiry situation requires the development of a locally appropriate research calendar that closely respects the environmental, productive, economic and cultural calendars of the host community. The calendar must be developed with the full participation of the host community prior to beginning the research so as to avoid delays and inconvenient overlaps with important community dates. It is suggested that the research calendar be developed during a community-wide half-day session. It is important to work at all levels of decision-making – community researchers, local authorities, and the community as a whole – as each grouping has particular knowledge of environmental, social or political events that may benefit or affect the work. The research calendars depend on the methods used, therefore each protocol follows its own specific calendar.
Monitoring of biodiversity and community-based management of natural resources

**Plant monitoring co-enquiry protocol**

The community-based plant monitoring protocol is designed to aid in the process of biodiversity monitoring for assessing the effectiveness of community-based natural resource management. Its ultimate aim is to act as a tool for adaptive management, with an emphasis on community priorities and aspirations for their community-conserved areas. It is designed in such a way that following training, community researchers are able to implement the monitoring process autonomously and take locally-relevant conservation decisions given the results of their monitoring activities. Through its emphasis on community-led investigation and regular data collection, the protocol is also designed to be adaptable and flexible given changes in community needs and environmental conditions.

The objectives were designed by the community research team, with the support of facilitators, using basic questions that address the realm of plants within a given community:

A. What are we talking about?
B. What are the plants that we have?
C. What are the landscape units or identified ecosystems we live in?
D. What do we want to know?
E. How do we answer our questions?
F. How do we analyse our results?
G. How our results are useful for community decision-making processes?

The following objectives and related activities were developed in the Chinantla context, and are therefore based on local needs and aspirations. Yet, as the method development was based on the above broad questions, these structure provided can easily be adapted by other facilitators in different contexts. The *Mutual Learning and Community Research Protocol* provides a detailed description of how to set objectives and research questions and how to develop a co-enquiry research protocol.

**A. What are we talking about?**

Any cultural domain (a set of items that are, in an obvious sense, of the same type) can be understood differently depending on the cultural context. Scientists may define the cultural domain “plants” based on the organism's morphological, metabolic or genetic characteristics, yet lay people, who often lump green organisms together, may include fungi, lichens and green algae in the same “plants” domain. Given these differences in cultural domain, it is important to base plant monitoring activities on a solid understanding of what the research team are talking about, especially in the context of an intercultural group (made up of external facilitators and community members).
Objective A.1 To define the cultural domain of plants among research participants

B. What plants do we have?
Once a common idea of “plants” is defined, the research team proceeds to identify plants the community have in their territory, and to classify them in any possible and locally relevant category, a process that helps to refine the research.

Objective B.1 To establish plant inventories.
B.1.1. Conduct a literature review on local plant studies;
B.1.2. Train community researchers in the creation and use of plant inventories;
B.1.3. Train community researchers in botanical collection;
B.1.4. Create digital herbaria useful in local environmental conditions;
B.1.5. Complement the inventories through the creation of a complementary photographic register.

C. What landscape units do we live in?
The description of landscape units in a territory or a region is often directly based on the plant species composition of certain areas, in conjunction with plant accessibility, land use, and so on. It is important to understand the distribution of such environmental units in order to better understand how to gather information, the potential relevance of this information for conservation decision-making processes, the logistical implications of conducting research in each unit, the use of plant resources in each unity, etc.

Objective C.1 To gather basic information on local landscape units.
C.1.1. To identify natural and anthropogenic landscape units according to local ethnoclassification and scientific classifications.
C.1.2. To identify the main species and plant groups that characterise each of the identified landscape units.

D. What do we want to know?
Once the basic information about what plants there are (plant inventories) and where they are (landscape units), the research team decides what they want to know about local plants. The range of possible questions can be very broad. The overarching research questions of Chinantec communities have been developed over the course of 6 years of ethnographic, co-enquiry and community planning fieldwork, and are based on their local research needs and aspirations. The specific research questions included in this protocol are those emerging from Chinantla community members and were formulated during the application of this protocol (see specifically Methods Group 3). It is particularly important that research questions are developed by the community as a whole as much as possible, as this integrates the co-enquiry process into community decision-making processes rather than isolating it as a parallel process that is only fully
known to the team of community researchers. The protocol for developing co-enquiry research questions is covered in detail in Chapter III and Methods Group 3.

**Objective D.1** To determine the specific questions related to local plants and vegetation to be answered through a process of co-enquiry.

**Task D1.1** Train community researchers to develop their own research questions

**E. How do we answer our questions?**

Once specific questions are posed, the research team elaborates a methodology for answering them. This stage involves the process of methods application, design and/or adaptation, and external academics and local researchers play an important role in it. Following our case study’s internal process for developing these co-enquiry methods, the research team proposed a set of research activities to compare floral composition and vegetation characterisation of swidden fallow fields (*acahuales* in Spanish) at different ages – from a few years old to over 50 years old. The age difference allows to compare *acahuales* at different successional stages, which may constitute secondary vegetation or even be very close to a “natural” forest. With this comparison the team planned to answer the locally defined question of how and how much the swidden fallow field contribute to the conservation of local biodiversity. This question is very relevant to the participant communities as they base most of their productive and subsistence activities in the continuum of *acahual* successional stages that can be identified by externals as different landscape units.
Objective E.1 Train community researchers in techniques for the study of floral composition and vegetation characterisation.

E.1.1 Reinforce local skills in botanical collection;
E.1.2 Train community researchers in basic botanical morphology;
E.1.3 Train community researchers in sampling, using previously defined techniques.

Objective E.2 Carry out collaborative research on the floral composition of local vegetation categories.

E.2.1. Carry out initial reconnaissance fieldtrips with community researchers;
E.2.2. Carry out collaborative comparative vegetation studies to generate information on acahuales, primary forests and conservation – for example, comparing young fallow swidden plots to secondary forests; comparing lowland vegetation and highland vegetation; comparing secondary forest with primary forest;
E.2.3. Establish plant inventories for each landscape unit under study;
E.2.4. Identify the presence or absence of plant species that are important for conservation in each of the distinct vegetation categories as baselines for community-based conservation actions;
E.2.5. Carry out studies on plant communities.

Objective E.3 To integrate the plant information into a Community Geographical Information System.

E.3.1. Georeference each material or data collection in a database to be integrated with the community maps; information on local categories of vegetation and examples of useful plants will be given particular attention;
E.3.2. Integrate the information in thematic community maps – both paper and digital.

F. How do we analyse our results?
The co-enquiry process must include the analysis of results in order to collectively make sense of the field data, reach synthesised results and draw conclusions that can be useful for decision-making processes.

For facilitators who are used to carrying out conventional research, it may be difficult to relinquish cherished systems for analysis, particularly those that require computer skills or complex statistics. Nevertheless, the process of simplifying and decoding procedures for data analysis can be an interesting and enlightening personal challenge for researchers. Therefore, the proposals for data analysis recommended here are the very basic creation of lists, additions, and making simple table and graphics through which the local research team can be introduced to quantitative data analysis. We are considering here local research teams who have a low level of formal education.

Even if the analysis is simple, it can take time and effort to be rigorous and to process considerable amount of field data. Therefore, it is very important that the facilitator is
prepared and communicates to the rest of the research team that the quantitative analysis may be laborious and time-consuming, but that is a needed step to give sense to all the fieldwork, find specific results and have useful information for decision-making.

**G. How can we use our results in community decision-making processes?**
The protocol for implementing a community-led workshop on results analysis in the context of community decision-making is included below, in the CRP on Basic Social Science research methods.

**Methodologies**

In this section, we describe the sequence of workshops, trainings, and ad-hoc CR support sessions to carry out the co-enquiry process in the Chinantla. The process of adaptation and training in specific methods undertaken in the Chinantla is described in the subsequent sections. For each training session described here and further below, it is important that a selected local research team that is committed to following the training and conducting subsequent field practice is in place. The local team must be informed well in advance regarding the dates and length of the training session, which must coincide with a previously established research calendar.

**Methods group 1. Definition of the cultural domain of plants**

<table>
<thead>
<tr>
<th><strong>Addresses Objective A.1 To define the cultural domain of plants among research participants</strong></th>
</tr>
</thead>
</table>

**Structured Dialogue**

There exist simple yet systematic techniques to delimit a cultural domain, such as free listing. However, the authors of this COMBIOSERVE protocol suggest that when talking about broad domains such as plants, animals, soils, etc. these can be initially described through qualitative techniques such as participant observation, interviews and focus groups. Participant observation is the basis for any participatory research, and the method is implemented by facilitators and community researchers alike (Please refer to Chapter III for more details on the method).

Participant observation requires the research team to participate in community life and general activities (subsistence, celebrations, social and even political events), and, through conversations, observation and embodied learning, gain knowledge regarding the research question, which in this case is the words, elements and limits that shape the local plant domain. The advantage of this technique within a co-enquiry process is that community researchers have been *de facto* observers of the local natural and social environment their entire life! Therefore, they have good – sometimes exceptional – knowledge concerning local cultural domains.
Once the research team has gained a general understanding of the plant domain, a focus group is organised to share ideas, words and limits of the domain. The limits are very important, as the research team need to determine whether some ‘unexpected’ organisms are included in the local plant domain or not – e.g. fungi, lichens and green algae.

Session Objectives
To identify the local cultural domain for plants, specifically the limits of the domain.

Facilitators
The focus group should be led by an external or local team member with abilities to lead a group discussion.

Participants
Local research team and any other community member interested in biodiversity and plants.

Expected results
At the end of the session, the participants will have a clear understanding of their cultural domain for plants, including its limits.

General thematic content
a) What is a plant, and what is not a plant, for us in the Chinantla?
b) How does the research team categorise plants in the Chinantla?

Learning experiences
- Theoretical revision of cultural domains;
- Structured group dialogue;
- Drawing consensus conclusions.

Session development
It is suggested the training session be organised as follows:

Figure 11: Gathering basic information on the cultural domain of plants

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
The facilitator explains the concept of a cultural domain.

III. Dialogue (focus group)
The co-enquiry format for implementing the focus group method has been developed as part of the CRP on Basic Social Science research methods (p.183-227). Should the
research team decide to carry out a conventional focus group (i.e. not using the co-enquiry method), the facilitator can lead the process according to simple, known formats.

The group elects a facilitator and a note-taker. The facilitator mediates a discussion between the participants about:

- What does the local plant cultural domain include;
- What does it exclude;
- What are the elements taking into account locally to categorise and classify plants.

The note-taker must take detailed note of all the discussion.

IV. Group conclusions
Besides the notes taken by the note-taker, important points of this dialogue will be registered in a table on a flip chart paper. At the end, the note-taker will complement the table, and a consensus conclusion will be drawn. This information is useful as basic information about the natural resources and will be used in future research techniques.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1 - 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1 - 1 hour, AM.</td>
</tr>
<tr>
<td>III. Focus group</td>
<td>Day 1 - 3 hours, AM.</td>
</tr>
<tr>
<td>IV. Conclusions</td>
<td>Day 1 - ½ hour, AM.</td>
</tr>
</tbody>
</table>

*Example of the work plan*

*Equipment and materials*
- Notebooks
- Pencils or pens
- Flip chart paper, cardboard
- Consultation books about local or regional plant diversity.

**Methods group 2. Ethnoclassification of local landscape units**

Addresses Objective C.1 To gather basic information on local landscape units

**Focus group**
In a similar process to that implemented for the plant cultural domain (Objective A.1), qualitative techniques, such as participant observation and focus groups, constitute a first approach to determining local landscape units. See Methods group 1 (above) for background information on participant observation.

Furthermore, eliciting local ethnoclassification helps us to comprehend more deeply local concepts and understanding of landscapes, providing language elements, local
characterisation components and varied knowledge, which will be used in the elaboration and adaptation of the subsequent monitoring methods. Ethnoclassification exercises help the research team understanding how people categorise a determined group of different objects. In this workshop, we propose to conduct one of the very basic tools to learn about ethnoclassification: dialogue. There are nevertheless more specialised and complex methods to study ethnoclassification, not only for landscapes, but for plants, animals and any other living or non-living element. For more methodological information on ethnoclassification see Martin (1995), Puri and Vogl (2005), and Santos Fita and Costa Neto (2009). For the purpose of this protocol, the authors limit their proposal to landscape ethnoclassification as it is the most related to the process research questions, but please also refer to the CRP on Fauna Monitoring for specific examples for the application of other ethnoclassification methods.

**Objectives**

1. To identify natural and anthropogenic landscape units according to local ethnoclassification and scientific classifications.
2. To identify the main species and plant groups that characterise each of the identified landscape units.

**Facilitators**

The focus group should be led by a external or local team member with abilities to lead a group discussion.

**Participants**

Local research team and any other community member interested in biodiversity and landscapes.

**Expected results**

At the end of the session, the participants will (i) recall and have a common understanding of local landscape-related concepts; (ii) know how to delimit a landscape unit; and (iii) identify landscape units present in the local territory and/or region.

**General thematic content**

a) What is a landscape?

b) What is a landscape unit?

c) What local landscape units is the research team working in?

**Learning experiences**

- Theoretical presentation for themes a) – b)
- Group dialogue for c)

**Session development**

It is suggested the training session be organised as follows:

I. Introduction  →  II. Theoretical revision  →  III. Dialogue

Figure 12: Gathering basic information on landscape units for plant monitoring
I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
The facilitator gives an overview of the concepts of landscape and landscape units, providing an academic definition of these.

III. Dialogue (focus group)
The co-enquiry format for implementing the focus group method has been developed as part of the CRP on Basic Social Science research methods (p.183-227). Should the research team decide to carry out a conventional focus group (i.e. not using the co-enquiry method), the facilitator can lead the process according to known formats.

The group elects a facilitator and a note-taker. Drawing on the definitions of landscapes and landscape units discussed above, the facilitator mediates a discussion between the participants about:

- The landscape units present in the community's territory, according to local definitions;
- Their characteristics;
- The differences and similarities between them;
- The plant groups, species and/or ethnospecies present in each unit;
- The animal species and/or ethnospecies present in each unit;
- Contrast local landscape units with those defined by academics.

The note-taker must take detailed note of all the discussion. And a synthesis of the results will be registered in a table on a flip chart paper. At the end, the note-taker will complement the table, and a consensus conclusion will be drawn. This information is useful as basic information about the natural resources and will be used in future research techniques.
Adaptations
In the Chinantla, the facilitators used images to support the process of ethnoclassification. They then showed the community researchers 8 images that illustrate issues connected to their territory (for instance of a swidden plot, forest, wild animal, river, surveillance, archaeological remains, etc.). The facilitators gave the participants time to observe the images, after which we launched the dialogue to elicit a common understanding of the terms ‘landscape’ and ‘landscape unit’ using questions such as “What do these images mean together?”, “What are they telling us?”, etc.

We found that it was important to have clear instructions regarding time limits and the amounts of images to be used for the ethnoclassification process, as, effectively, too much time and too many images tended to create confusion. Our conclusion was that the exercise of image selection should not last more than 10 minutes, and that its success would depend on the clarity of the images used and on the active participation of community researchers in the process.

It is also important to settle language issues (mainly: translations of key terms) prior to the beginning of the exercise, as these issues could result in the extension of time frames. The facilitator is encouraged to take note, prior to the workshop, of relevant local language plant names and plant classification systems. With appropriate previous coordination, the exercise should not last more than 30-45 minutes.

Example of the work plan

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</table>

Equipment and materials
- Notebooks
- Pencils or pens
- Flip chart paper, cardboard
- Consultation books about local or regional ecosystems and landscapes.

Methods group 3. Workshop to determine research questions

Addresses objective D.1. To determine the specific questions related to local plants and vegetation that will be answered through a process of co-enquiry

Training and analysis workshop
This workshop tackles the overall research process: its broader goal is for community researchers to understand basic (and conventional) research cycle. For the purposes of this protocol, the authors of this COMBIOSERVE protocol adapted the process to plants and vegetation research and monitoring, however it can be used as a basis for any other research objective.
Workshop objectives

- To share with community researchers the basic elements of the research cycle, by comparing them with daily processes;
- To determine specific questions related to local plants and vegetation to be answered through a process of co-enquiry.

Facilitators

This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with expertise in research processes.

Participants

- Local research team and any other community member interested in plant diversity and general research.
- Special attention must be given to integrate different social groups of the community into the workshop, such as women, young people and elders, as they can provide different views of the needs and local realities.

Expected results

At the end of the session, the participants will (i) be acquainted with a research cycle and its steps; (ii) recognise general research processes they implement in their daily lives to answer questions; (iii) have a general picture of the local needs and context regarding natural resources management; and (iv) have defined overarching research questions to be answered through a co-enquiry process.

General thematic content

a) Finding a common language for research.
b) The research cycle
c) Mapping natural resources uses, opportunities and conflicts
d) Selection of research themes
e) Selection of research questions

Learning experiences

- Theoretical presentation and dialogue for a) and b)
- Making maps for c)
- Information systematisation and focus group for d) and e)

Session development

It is suggested the training session be organised as follows:
Figure 13: Framework for determining vegetation-related research questions

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
In this section, two theoretical issues will be addressed:

1. A common language for the research process
2. The research cycle

Language is important tool to reach a common understanding of a research process. Often external academics are used to freely deploying scientific and technical language without taking into account that most local people may not understand it. This section is not aimed at teaching or transferring the scientific and technical words to the community researchers, but rather at reaching a common understanding, between facilitators and community researchers, of how to name particular processes, objects, tools, approaches, etc.

For the purposes of this protocol, the authors of this COMBIOSERVE protocol propose to determine a common language for the overarching domains of natural resource management, the effectiveness of community conservation and plants in general. For each one of these, the facilitator promotes an exchange of ideas: dialogue is encouraged to analyse the differences between the external and the local definitions.

The team’s work to define mutually understood concepts will continue throughout the workshop, as and when needed.

The proposed terms for discussion are:

- Co-enquiry
- Research
- Conservation
- Biodiversity
• Vegetation
• Monitoring

The facilitator must be aware that some words may have a stronger political load and therefore may need more time to be defined.

As a first result of this exercise, the team should adapt the language used during the rest of the plan research process to the one that was commonly defined.

III. Dialogue and methodological reflection
Assuming that most of the local participants have no previous experience with the scientific method and/or the research cycle, in this section a presentation and explanation of both concepts is provided. The facilitator then promotes a dialogue about the previous experience of the participants with these concepts and associated processes, even if participants do not know the terminology. Questions posed include: Have they ever used these processes in daily life? Are these research processes useful to solve local problems? How? What other steps do the research team usually follow and how can we complement the conventional action research cycle?

IV. Creating a basic map for mapping natural resources, their uses, opportunities and conflicts
The creation of an initial, general, mind map of the resources, their uses, opportunities and conflicts found in the territory, will generate:

• A preliminary picture of the natural resource conditions;
• A landscape level analysis of natural resource management in the community territory;
• Criteria that may be useful to measure the success of the plant management practices and strategies.

To begin with, participants will be asked to draw a map of their territory on white flipchart paper. The map should have basic geographical elements such as the community boundaries, main water bodies, main mountains or hills, the urban area, main roads, and landscape units (see Methods group 2).

Once the map is created, the group will proceed with the common definition of:

• Territory
• Territorial use
• Landscape (taken from Methods group 2)
• Landscape unit (taken from Methods group 2)
• Land change
• Conflict
• Opportunity

Subsequently, using the map as the main tool to generate information and with the support of the facilitator, the group discusses:
- Natural resources found in each landscape unit
- General uses of those resources
- Conflicts related to those resources
- Opportunities related to those resources

Two map layers will be created using 2 sheets of tracing paper. Resources and their uses are identified on the first layer; conflicts and opportunities on the second. When identifying conflicts and opportunities, special attention must be given to external and internal initiatives and projects that are present in, or relate to, each landscape unit. On each sheet, marks, labels, signs and icons can be drawn to identify the different elements.

Upon completion of the map, a table like the one below will be drawn on a flipchart page. For each landscape unit, the information about resources, uses, conflicts and opportunities will be registered.

Table 3: Example of an information table about natural resources, their uses, conflicts and opportunities

<table>
<thead>
<tr>
<th>LANDSCAPE UNIT</th>
<th>Resources</th>
<th>Uses</th>
<th>Conflicts/opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>Wood</td>
<td>House and furniture building</td>
<td>Illegal logging Payments for Environmental Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cooking and heating</td>
<td>Ensuring an adequate supply of firewood for the community</td>
</tr>
<tr>
<td>Firewood</td>
<td>Animals</td>
<td>Food</td>
<td>Formal management units Lack of information about populations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game</td>
<td>Lack of information about populations Hunting restrictions</td>
</tr>
<tr>
<td>Acahual (Swidden fallow fields / secondary vegetation)</td>
<td>Animals</td>
<td>Food</td>
<td>Lack of information about populations</td>
</tr>
<tr>
<td></td>
<td>Coffee</td>
<td>Sale Local consumption</td>
<td>Low prices</td>
</tr>
<tr>
<td></td>
<td>Fruits</td>
<td>Food</td>
<td>Alternative to junk food</td>
</tr>
<tr>
<td>Agricultural zone</td>
<td>Soils</td>
<td>Milpa cultivation</td>
<td>Lack of information on how to improve productivity</td>
</tr>
</tbody>
</table>

V. Defining research themes.
The above table promotes reflection and helps in the choosing of locally relevant and interesting themes for co-enquiry. For this selection, the following three stages are proposed:

A. Dialogue about the synthesis table, briefly reviewing the main concepts and their relation with the basic map.
B. Identification and writing down a list of broad questions that the team wants to answer.
C. Prioritizing the research themes (broad questions). This can be done by voting on the different themes.

**Adaptations**

In order to carry out this aspect of the process, in the Chinantla, the facilitators carried out a *diálogo problematizador* (problematising dialogue) and *intercambio de saberes* (knowledge exchange), which aims to cover all aspects of community relationships with their environment. Using images illustrating the themes of hunting, food, community control, care for the territory, tradition, etc. helped to launch a group dialogue aimed at pinpointing key themes for community research (some of which were not immediately relevant to the present protocol but were used for other protocols).

This dialogue must be given ample time and cannot be rushed; in this way participants feel they can speak freely, clarify and engage in fruitful discussion when opinions diverge, and come to an optimum consensus.

It may be the case that participants don’t at first understand the utility of this dialogue; it is the facilitator’s role to remind participants of why they wished to carry out the research in the first place, perhaps by reminding the community research team of other interventions that were non-participatory or imposed, and that the community was unhappy about. The GDF team found it useful to regularly return to the reasons why the communities had chosen to engage in research work, as in those reasons community researchers were able to find renewed enthusiasm for the work. In this sense, engaging in problematising dialogues throughout the research process is suggested.

**VI. Defining research questions**

This section constitutes the fine-tuning of the broad research themes. Following the thematic prioritization exercise carried out, the first three most important themes will be selected. For each theme the facilitator will guide the identification of a series of very specific research questions. The group will begin the dialogue about what kind of information is needed to answer those questions, the feasibility to address them, the need of specialists, etc. The questions will determine the subsequent steps and community researcher training programme.
Adaptations
Over the course of GDF’s experience in the Chinantla, the authors of this COMBIOSERVE protocol have learned that many people from rural communities tend to react rapidly to phenomena they observe – which is an advantage when one depends exclusively on the (eminently uncontrollable) natural environment for one’s survival.

This rapid reaction and swift movement towards solution-seeking sometimes was counterproductive in those methodological sessions that required deep reflection and highly participatory dialogue, such as the one in which research questions are developed. Indeed, it is a well known fact that the pre-requisite for successful research processes solid, internally coherent, and precise research questions. When it arose during the research question-development session that some individuals wished to rush the process, the GDF facilitator adopted more of a role of moderator, meaning that more strict rules for the dialogue were used. For example, participants who tended to be quieter were specifically encouraged to take the time to express their opinions, and the dialogue was not considered concluded until all participants arrived at consensus regarding the final research questions.

Each research team will develop their own appropriate rhythm for these discussions, and this can vary as long as it allows for full participation of all members present, complete discussion of the points raised and the airing of constructive criticism.

VII. Tasks

Based on the research themes and questions, the team defines the subsequent steps required to answer those questions, as well as the tasks and calendar of activities required to implement those steps over the subsequent months of research.

Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 1 hour, AM.</td>
</tr>
<tr>
<td>III. Methodological reflection</td>
<td>Day 1. 2 hours, AM.</td>
</tr>
</tbody>
</table>
| IV. Creating a basic map for mapping natural resources, uses, opportunities and conflicts | Day 1. 1 hour, AM.  
- Drawing the mind map  
- Concepts definition  
- Drawing map layers  
- Synthesis of information in a table. |
| V. Defining research themes | Day 2. 1 hour, AM. |
| VI. Defining research questions | Day 2. 2 hour, AM. |
| VII. Tasks | Day 2. 2 hour, AM. |

Equipment and materials
- Notebooks
- Pencils or pens
• Flip chart paper, cardboard
• Tracing paper sheets
• Colours
• Marker pens
• Educational material to illustrate the action-research cycle
• Projector

### Methods group 4. Creation of plant inventories

**Addresses objective B.1 To establish plant inventories.**

#### 4.1 Literature review

As with conventional research approaches, it is necessary to ground practical co-enquiry research in a solid literature review. In the case of plant inventories, having a literature review helps to determine existing knowledge regarding the diversity of plants or vegetation structure in the region or in similar ecological areas. This process provides the team with a basis upon which to develop their ideas, to determine gaps in the knowledge and to reflect on how existing information relates to local issues and needs. In the present case study, the Chinantla research team looked for botanical and ethnobotanical plant inventories carried out in the biocultural region of the Chinantla, in the state of Oaxaca and in other regions of Mexico where cloud forests and tropical forests are present. The amount of information drawn on for the literature review will vary depending on how well-studied a region or an ecosystem is. While in this case study the authors of this COMBIOSERVE protocol were unable to carry out a collaborative literature review, we suggest practitioners adapt the following suggested process for implementing such a literature review.

**Session objective**
The research team (facilitators and community researchers) to have a good knowledge of previous studies and works relevant to their research topic and fieldsite

**Facilitators**
This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with some basic expertise in developing literature reviews.

**Participants**
Community researchers and any community member interested in what has been published regarding their resources and/or region.

**Expected results**
A locally relevant review of existing literature on plant diversity, vegetation structure and general ecology of the region.

**General thematic content**
- a) Doing a literature search
- b) Reading, summarising and discerning appropriate literature for the research at hand
Learning experiences

- Publications as a source of useful information
- The importance of discernment when reading from varied sources
- Building a collaborative literature review

Session development

It is suggested the training session be organised as follows:

Figure 14: Framework for training community researchers in the production of literature reviews

I. Introduction
The facilitator provides the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical background
The facilitator explains the importance of a literature review in the context of biodiversity research, for example by demonstrating an important finding that scientists have made and that informs the community’s current use of plants or other resources. The facilitator then explains what a literature review is (a critical assessment of how previous research relates to the present research process) and describes the process for creating one. While the community researchers will briefly learn how to do a literature search (online, libraries, etc.), it is unlikely that they will have easy access to scientific literature. Here it is suggested that the research team determine a mutually agreed process for the facilitator to share relevant literature with the community researchers as and when it emerges or is discovered.

III. What does the literature say?
Based on the brief theoretical overview, the facilitator presents summaries of specific and locally-relevant publications on the research topic and region (these will have been searched for and summarised by the facilitator prior to the session). The group discusses the validity (or not) of the results and arguments made in each main publication, in terms of:

- whether they think the results/arguments are accurate given their knowledge of local diversity, ecology, etc.
- whether they think the body of data/arguments are relevant to answer their own research questions.
- how they think the information can be used in their research process

Responses are written up in a table format on a flipchart page. The following format is suggested, although research teams are encouraged to develop their own mode of systematising the literature.

Table 4: Matrix for systematising literature
IV. Building a locally-relevant literature review

Given that an academic literature review is unnecessary in a community context, the authors of this COMBIOSERVE protocol suggest that a locally-relevant one be built, using a simple spreadsheet computer programme and based on the information contained in the flipchart.

Table 5: Matrix for building a locally-relevant literature review

<table>
<thead>
<tr>
<th>Publication</th>
<th>Summary</th>
<th>Results</th>
<th>Argument</th>
<th>Relevance</th>
<th>Accuracy</th>
<th>How will it be used?</th>
</tr>
</thead>
</table>

Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop preparation</td>
<td>At least 1 month before the workshop&lt;br&gt;- the facilitator does the reading, chooses the most appropriate literature (no more than 5 main publications) and prepares summaries of the publications for discussion in the workshop</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 30 minutes, AM.</td>
</tr>
<tr>
<td>III. Review of the available literature</td>
<td>Day 1. 3 hours, AM.&lt;br&gt;- presentation of the available literature by the facilitator&lt;br&gt;- discussion surrounding its validity and relevance for the research at hand</td>
</tr>
<tr>
<td>IV. Building a relevant literature review</td>
<td>Day 1. 2 hours, PM.&lt;br&gt;- building and completing of a literature review spreadsheet – each community researcher helps input the data for at least one publication</td>
</tr>
</tbody>
</table>

4.2 Training community researchers in the creation and use of plant inventories

Training session

Session objective

To share and review with community researchers the concept and use of plant inventories as well as to create local floristic inventories.
Facilitators
This workshop must be facilitated by an external or local team member knowledgeable on botany and with expertise on floristic studies and inventories.

Participants
Local research team and any other community member interested in plant diversity.

Expected results
At the end of the session, the participants will:

(i) Understand the concept of inventory and floristic inventory;
(ii) Understand the uses of floristic inventories;
(iii) Have reflected on the possible local uses of floristic inventories and how they relate to their current research questions and needs;
(iv) Have a theoretical understanding of the different methods to conduct plant inventories;
(v) Have reviewed available plant inventories for the region.

General thematic content
a) Concepts of inventory and floristic inventory.
b) Uses of floristic inventories.
c) Methods to create floristic inventories.

Learning experiences
• Theoretical presentation for themes a) – c)
• Focus group for reflection on b)
• Team work for revision of available floristic inventories.

Session development
It is suggested the training session be organised as follows:

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
In group, the facilitator will present:
• Concepts of inventory and floristic inventory.
• The uses that academics and other professionals give to floristic inventories.
III. Review of available inventories
Prior to the session, the facilitator searches for academic or local inventories produced for the community, region, state or places with similar vegetation. Printed copies are taken to the group. (For efficiency, this process can be done simultaneously with the literature review for method 4.1.). Subsequently, either the entire team or a series of sub-teams read the inventories. The facilitator highlights the objectives of the inventories, and the parameters and methods used to create them.

The facilitator promotes a dialogue about how these inventories (or this type of inventory) can be useful locally. How do they relate to their current research questions? How do they relate to local needs regarding resource management, conservation, or agricultural production?

IV. Methods revision
Integrated with the previous section, this section will focus in the methods for the production of inventories, taking the available inventories as initial examples of the process. Several questions and points must be reviewed, such as: do these inventories use scientific or common names? How have the authors compiled the list of plants? Did they ask local people and/or carry out field collections? How did they implement field collections? The facilitator takes the time necessary to explain the methods used by the authors of the inventories under scrutiny.

V. Methods reflection
Integrated with the methods revision, a reflection on the feasibility and implications of the methods will be conducted. Some of the themes to talk about are:

- Is that possible to conduct X or Y method locally? What would the team need for each of them?
- What are the implications of using scientific names vs. local names?
- What is the objective and use of the inventories? How can the local research team control the access to the information contained in the inventory? Is that control needed?
- The results of this dialogue will provide inputs to future decision-making on the objective and management of all information and collected material.

VI. Tasks
Once available inventories and their methods have been reviewed, some questions must be answered:

- Is there any need to produce local plant inventories?
- What kind of inventories do the team wish to produce?
- Which plants groups do the team wish to include?
- Which methods will they use?
- What training does the team need to implement the selected methods?
- How will the team get organised to conduct such inventories?
In the following workshop protocol “Training community researchers in botanical collection”, we propose to produce ethnobotanical inventories based on local botanical collections that can be later enriched with scientific names and supplementary photographic material.

VII. Methodological reflection
While developing the inventories and applying the selected methods, a periodical methodological reflection is necessary to check that the method is working and to resolve any problems, obstacles or challenges that the team may be encountering. For each case a solution is provided: either the team adapts to the pre-defined method, or the method is adapted to the team and other local realities/needs. If the team decides to adapt the method rather than the team process, they are encouraged to reflect on how changing the method may affect the final result.

VIII. Results analysis
Once an inventory is produced, the team analyses the results. The analysis can be made at different levels, depending on our research questions. For example, answering questions of how many species did the team found, how many families are reported in the revisited studies, what is the value for each specie, etc. In order to make the process of analysis efficient, the inventory results can be organised by species in a simple paper or computer-based spreadsheet including plant family, gender, species, common name and use.

IX. Methodological reflection
After the process is completed, the facilitator promotes another revision of the methods used, this time including the methods to analyse the results. The following themes are suggested for group discussion:

1. Do the methods provided the expected results?
2. Does the results analysis provide the answer to our original research questions?
3. What information is missing?
4. How can the result analysis be improved?

Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop preparation</td>
<td>At least 2 weeks before the workshop</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 45 minutes, AM.</td>
</tr>
<tr>
<td>III. Review of available inventories</td>
<td>Day 1. 2 hours, AM.</td>
</tr>
<tr>
<td>IV. Methods revision</td>
<td>Day 1. 1 hour, AM.</td>
</tr>
<tr>
<td>V. Methods reflection</td>
<td>Day 1. 1 hour, AM. Integrated with IV.</td>
</tr>
<tr>
<td>VI. Tasks</td>
<td>Day 1. 1 hour, PM.</td>
</tr>
<tr>
<td></td>
<td>- Definition of needs</td>
</tr>
<tr>
<td></td>
<td>- Definition and distribution of tasks</td>
</tr>
<tr>
<td></td>
<td>Following weeks: completion of defined tasks.</td>
</tr>
<tr>
<td>VII. Methodological reflection</td>
<td>Following weeks.</td>
</tr>
<tr>
<td>VIII. Results analysis</td>
<td>After finishing the set tasks.</td>
</tr>
</tbody>
</table>
IX. Methodological reflection  | After finishing the set tasks.

Equipment and materials

- Available plant inventories for the region, state or regions with similar vegetation
- Notebook
- Pencils or pens

4.3 Train community researchers in botanical collection

Community workshop

Workshop objectives

(i) To train local researchers to carry out research on plant diversity, through botanical collections.
(ii) To build community researchers capacities with the skills required for the study of floristic composition and characterization of the vegetation.
(iii) To train community researchers in botanical collection.
(iv) To train community researchers in basic botanical morphology.
(v) To generate data and products during the workshop, and the subsequent practices that are part of the community heritage.
(vi) To have useful data and products for communication regarding local biodiversity and for decision-making processes about natural resources management, conservation and agricultural production.

Facilitators

This workshop must be facilitated by an external or local team member knowledgeable on botany and with expertise in botanic collections. Further information on plant collection methods can be found in Bridson and Forman 1998, Lot y Chiang 1986, or any other herbarium manual.

Participants

Local research team and any other community member interested in plant diversity.

Expected results

At the end of the workshop, the participants will have acquired (i) basic skills for collection of botanical specimens; (ii) basic knowledge in botanical morphology that support the recognition and identification of plants according to both local and scientific classification systems; (iii) technical capacities to study the floristic diversity in agricultural, conservation and other resource management projects.

General thematic content

a) Features and utility of the botanical collection.
b) Features and utility of a herbarium.
c) Specific techniques of botanical collection.
d) Basic morphological botanical elements.
e) Plant pressing.
f) Basic techniques for drying plants.
Learning experiences

- Group study for the theoretical presentation and methodological reflection for themes a) and b).
- Theoretical and practical presentation in the field for themes c) – g).
- Plant collection hands-on practice around the community in trails previously identified and chosen by workshop participants. The collections will comprise plants from a variety of habitats (from mosses to trees, including herbs, vines, etc.) with the objective of examining the possible variations in the collection, pressing and mounting processes that are adapted to the different plant forms. Plant pressing, labelling and voucher mounting will be practised.

Session development

It is suggested the workshop be organised as follows:

Figure 16: Framework for training community researchers in botanical collection

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical presentation
Using the information gathered during the literature review as support material, the facilitator will lead a theoretical introduction and a dialogue about the methodological, practical and political aspects of:

- The concept and use of a botanical collection;
- The concept and use of an herbarium;
- Differences between academic and community herbaria. For example, the need of the scientific name for the former; the different types of information that each of them contain;
- The different techniques for plant collection;
- Botanical morphology;
- The importance of morphological recognition in plants, relating it with local and scientific systems for species identification. Prints of different kind of roots, flowers, leaves, etc. can be used to learn and reflect on which plant parts are more useful for local plant recognition.

III. Methodological reflection
Integrated to the previous theoretical revision, a dialogue about the plant collection as a way of gathering information. This will be conducted through a two-way (facilitator <-> community research team) questions-and-answers session. Some important points to reflect on are:

(i) Scientific identification, its usefulness and implications;
(ii) The goal and use of collected material;
(iii) From these two points some decisions can be made regarding the goal and management of information and collected material.

Other themes for the dialogue can be: a) what is community researchers’ opinion regarding cutting plants and drying them out to obtain information; b) the use given to the collected plants information in academic and community herbaria; and c) what is the importance that the training and proposed activities for the research team and the community at large, and so on.

Given the social, cultural and political importance of these issues, it is important to provide time for in depth exploration of these questions, and the development of mutually acceptable answers for all of the questions that arise from the team.

IV. Technical training (theoretical and practical)
- Knowing the collection material
- Specific techniques for plant collection
- Basic botanic morphological elements
- Plant pressing techniques
- Filling collection cards
- Plant drying techniques

V. Tasks
Tasks will be planned to practice and strengthen the acquired skills. In order to generate relevant information for a community these tasks must be planned according to research questions and local information needs. As a basic proposal, collections can be carried out to produce an ethnobotanical inventory of one or two categories of local useful plants. The information collected during these activities will belong to the community and will be used for further analysis and use in decision-making processes. The community research team can choose how to distribute the tasks required for this element of the work.

VI. Methodological reflection
While developing the inventories and applying the selected methods, a periodical methodological reflection is necessary to check that the method is working and to resolve any problems, obstacles or challenges that the team may be encountering. For each case a solution is provided: either the team adapts to the pre-defined method, or the method is adapted to the team and other local realities/needs. If the team decides to adapt the method rather than the team process, they are encouraged to reflect on how changing the method may affect the final result.
VII. Results analysis
Once the collections are finished, the team analyses the results. The quality of the data will depend on the efficiency of the training and close follow-up of the community researchers' field practice by the facilitator. Data analysis can be carried out at different levels and will depend on what information is being gathered in the collections and what how the team wants to use that information for furthering their knowledge. In all cases, starting with a paper or computer-based spreadsheet that organises the information by species and includes the information gathered (i.e. plant family, gender, species, common name, use, life form, locality, etc.) will give order to the data and ensure an easier and more efficient analysis process. Subsequently, specific questions can be generated and answered. For example, if the proposal above is followed and collections are carried out to produce an ethnobotanical inventory of, let's say, species used for firewood, the analysis can include variables such as the number of species, the localities where they were found, the species most frequently found, the represented botanical families, among others.

Example of a work plan.
This work plan should be adapted to local conditions and realities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop preparation</td>
<td>A minimum of 2 weeks before the workshop</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>Day 1. 30 minutes, AM</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 1 hour, AM</td>
</tr>
<tr>
<td></td>
<td>• Definition and use of a botanical collection</td>
</tr>
<tr>
<td></td>
<td>• Definition and use of the herbarium</td>
</tr>
<tr>
<td></td>
<td>• Differences between an academic herbarium and a community herbarium</td>
</tr>
<tr>
<td></td>
<td>• Plant collection techniques</td>
</tr>
<tr>
<td></td>
<td>Day 1. 1 hour, AM</td>
</tr>
<tr>
<td></td>
<td>• Botanical morphology</td>
</tr>
<tr>
<td></td>
<td>• Morphological examination of the plants using local and scientific systems of recognition</td>
</tr>
<tr>
<td>III. Methodological reflection</td>
<td>Day 1. 1 hour, AM. Integrated with previous theoretical revision</td>
</tr>
<tr>
<td>IV. Technical training</td>
<td>Day 1. 2 hours, PM</td>
</tr>
<tr>
<td></td>
<td>• Collection material</td>
</tr>
<tr>
<td></td>
<td>• Field practice planning</td>
</tr>
<tr>
<td></td>
<td>Day 2. 3 hours, AM</td>
</tr>
<tr>
<td></td>
<td>• Choosing a sampling site.</td>
</tr>
<tr>
<td></td>
<td>• <em>In situ</em> presentation of collection techniques</td>
</tr>
<tr>
<td></td>
<td>• Observation of morphological elements</td>
</tr>
<tr>
<td></td>
<td>• Filling collection cards</td>
</tr>
<tr>
<td></td>
<td>Day 2. 2 hours, PM</td>
</tr>
<tr>
<td></td>
<td>• Filling of collection cards</td>
</tr>
<tr>
<td></td>
<td>• Plant pressing techniques</td>
</tr>
<tr>
<td>Day 3. 3 hours, AM</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>• Plant drying techniques</td>
<td></td>
</tr>
<tr>
<td>• Choosing a sampling site.</td>
<td></td>
</tr>
<tr>
<td>• <em>In situ</em> presentation of collection techniques</td>
<td></td>
</tr>
<tr>
<td>• Observation of morphological elements</td>
<td></td>
</tr>
<tr>
<td>• Filling collection cards</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 3. 2 hours, PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Filling of collection cards</td>
</tr>
<tr>
<td>• Plant pressing techniques</td>
</tr>
<tr>
<td>• Plant drying techniques</td>
</tr>
</tbody>
</table>

| V. Tasks |
| Day 4. 1 hour, AM. |
| • Planning and organisation of future tasks |

| VI. Methodological reflection |
| Day 4. 1 hour, in the AM |
| • Integrated to the practical work of the previous session |

| VII. Analysis of results |
| When the collections are finished. |
| 2-3 days. 4 hours per day. |

## Material and equipment

<table>
<thead>
<tr>
<th>Material for the collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden scissors</td>
</tr>
<tr>
<td>Machete</td>
</tr>
<tr>
<td>Pole vaulting with scissors at the end of the rod</td>
</tr>
<tr>
<td>Big and thick plastic bags</td>
</tr>
<tr>
<td>Transparent bags</td>
</tr>
<tr>
<td>Botanical press</td>
</tr>
<tr>
<td>Sheets of newspaper</td>
</tr>
<tr>
<td>Three-layer corrugated cardboard</td>
</tr>
<tr>
<td>Botanical press belts</td>
</tr>
<tr>
<td>Thick leather gloves (for prickly plants)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material for data record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stickers</td>
</tr>
<tr>
<td>Hang tags</td>
</tr>
<tr>
<td>Notebook (Report card)</td>
</tr>
<tr>
<td>Pencils and permanent black ink pens</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complementary equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPS or altimeter and compass</td>
</tr>
<tr>
<td>Photographic camera</td>
</tr>
<tr>
<td>Stereoscope</td>
</tr>
<tr>
<td>Magnifiers with lights or without it</td>
</tr>
<tr>
<td>Petri dishes</td>
</tr>
<tr>
<td><strong>Binoculars</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional material for the facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books and Manuals of Botanical collection.</td>
</tr>
<tr>
<td>Plasticized didactic cards of plant morphology.</td>
</tr>
</tbody>
</table>
4.4 Creation of a digital herbarium

Training workshop

Session objective
Establishing and maintaining a community herbarium requires considerable input of energy and time, both of which are scarce in rural communities. Given the high level of humidity in many sub-tropical or tropical environments and the presence of a great diversity of pests, the herbarium must be housed in an appropriate building and constantly maintained (requiring staff time and electricity at the very least). Nevertheless, a local herbarium is an excellent way to keep a physical record and result of the inventories and plant collection work; it can also serve as an educational tool to share with children and adults about the local plants; and herbaria provide a register of the species and varieties found in the community that can be useful for resource management, conservation and agricultural projects.

Through this workshop the authors of this COMBIOSERVE protocol seek to overcome the disadvantages and challenges of establishing an herbarium, while ensuring the community benefits from its multiple uses. To do so, the authors propose to create a digital herbarium with photos of collected vouchers, filed alongside their attendant information that can be printed and maintained by the community.

The workshop will provide participants with the basic techniques for labelling and mounting dry and pressed voucher specimens, as well as photography techniques for dry specimens.

Facilitators
The workshop must be guided by the external or local team member who facilitated the plant collection workshop and is knowledgeable in voucher mounting. Additionally the facilitator must have expertise in photography; alternatively the workshop can be led by two facilitators with different abilities.

Participants
Local research team and any other community member interested in plant diversity.

Expected results
At the end of the session, the participants will have (i) the capacity to produce an accurate register of botanical collections; (ii) produced a digital herbarium that is useful given local weather/pest conditions; (iii) the skills to mount and photograph voucher specimens; and (iv) the skills to manage photographic files in the computer.

General thematic content
a) Importance of an information register and accurate labelling; basic contents of a voucher specimen label.
b) Labelling dry and pressed voucher specimens.
c) Mounting plant vouchers; differences between temporal and permanent pressing mounting.
d) Photography of mounted vouchers.
e) Creating a computer photographic data base.
f) Printing and laminating photographs.
Learning experiences

- Theoretical presentation for a)
- Guided practice for b) - e)

Session development

It is suggested the training session be organised as follows:

![Diagram](image)

**Figure 17: Framework for training community researchers in creating digital herbaria**

I. Introduction

The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Hands-on practice in voucher labelling

- The facilitator will provide some information about the importance of information registers and labelling.
- The basic content of a voucher specimen label will be addressed. Examples of labels will be shown to the team. The label that best suit local needs and the project characteristics will be selected; participants to evaluate whether any further information field should be added.
- Hands-on practice to compile labels for all the previously collected specimens.

III. Hands-on practice in voucher mounting

Working with the dried voucher specimens collected in the previous methods group, the facilitator will show the team:
- How to mount plant specimens.
- Exemplify with photographs of mounted vouchers.
- The differences for mounting different plant forms and plant groups.

IV. Hands-on practice in photography of mounted vouchers

Working with the specimens that were mounted and labelled, the facilitator will guide their photographic registration. The facilitator will provide guidance on all the details needed to obtain a high quality photo, such as use of tripod, light and exposure requirements, digital camera settings, subject and framing, etc.

V. Hands-on practice for creating a computer database
Given the importance of the information register for the production of a high quality photographic collection and because the herbarium database is to be used as an educational and decision-making tool, the facilitator leads the participants as they:

- study example of databases used in other herbaria;
- decide what fields of information will be used in their particular case;
- practice data entry;
- learn how to use an spreadsheet to retrieve particular information from the database.

VI. Printing and laminating photographs

Integrated with the methods revision, a reflection on the feasibility and implications of the methods will be conducted. Some of the themes to talk about are:

- Is it possible to conduct X or Y method locally? What would the team need for each of them?
- What are the implication of making a scientific names vs. an ethnobotanical inventory?
- What is the destiny and use of the inventories? How to control the access to such information? Is that control needed?
- The results of this dialogue will provide inputs to future decision-making on the use and management of information and collected material.

**Example of a work plan**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Voucher labelling practice</td>
<td>Day 1. 45 minutes, AM.</td>
</tr>
<tr>
<td>III. Voucher mounting practice</td>
<td>Day 1. 1 hour, AM.</td>
</tr>
<tr>
<td>IV. Photography of mounted vouchers</td>
<td>Day 1. 2 hours, AM.</td>
</tr>
<tr>
<td>V. Creating a computer database</td>
<td>Day 1. 2 hours, AM.</td>
</tr>
<tr>
<td>VI. Printing and laminating photographs</td>
<td>Day 1. 1 hour, PM.</td>
</tr>
</tbody>
</table>

**Equipment and materials**

1. flip chart paper;
2. previously collected plant vouchers;
3. white cardboard cut to herbarium standard measures;
4. examples of herbarium labels;
5. printed herbarium labels with basic information;
6. markers;
7. pens;
8. examples of photographs of dry vouchers;
9. adhesive tape;
10. white glue;
11. digital camera;
12. tripod;
13. computer;
14. Examples of herbarium databases.
4.5 Creation of a complementary photographic register

**Training workshop**

**Workshop objectives**
- Train community researchers in basic photography techniques so as to obtain a photographic register of live specimens that will complement the plant inventories and/or the digital herbarium.
- Provide conceptual and practical training on nature photography, as a way of communicating and reflecting on the issues surrounding environment, livelihoods and community.

**Facilitators**
The training workshop is led by a professional photographer trained in participatory approaches.

**Participants**
Local research team and any other community member interested in plant diversity and photography.

**Expected results**
At the end of the session, the participants will have (i) acquired photography techniques to make photographic registers of live plants and to take photographs of natural features in general; (ii) the technical abilities to use photography for plant monitoring purposes; and (iii) established a preliminary photographic collection.

**General thematic content**
- a) The camera and its parts;
- b) Basic technical aspects of photography;
- c) Advanced photography functions used in nature photography;
- d) Photography in-field practice;
- e) Managing digital images;

**Learning experiences**
- Theoretical presentation for themes a) – c)
- Hands-on and one-on-one practice tuition for b) – f)

**Session development**
It is suggested the training session be organised as follows:

Figure 18: Framework for training community researchers in (plant) photography
I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
In a group, and depending the level of photography knowledge that the group has, the facilitator will discuss:

(i) Optical principles for photography;
(ii) Parts of the camera;
(iii) The role of the photographer, how to take a ‘good’ photo, observing the subject, etc.;
(iv) Basic technical aspects of photography: frames, composition, colour, light, etc.
(v) Advanced photography functions used in nature photography: macro, underwater photography, etc.

III. Field practice
In a group, several settings and natural elements will be identified to practice taking photographs. Based on the theoretical knowledge previously acquired, the facilitator will guide hands-on practice and will provide one-on-one practice tuition on the following:

• Landscape photography;
• Taking photos of complete trees, shrubs, herbs, vines, and other minor plant forms;
• Taking photos of the reproductive organs of the plant, flowers, fruits and seeds;
• Taking photos to other plant organs that help with plant identification according to local parameters, such as roots and leaves.

IV. Methodological reflection
In a group, the facilitator leads a revision of the methods used. Given that the camera is a technical tool, methods for its use cannot be completely adapted. However, the group can analyse and discuss the uses of the camera, the difficulties and challenges that they faced, as well as on other uses that photography can offer them, particularly as community researchers. As photography is both a technical and an artistic tool, the facilitator may lead this discussion with the purpose of fomenting participants' creativity.

V. Digital image management practice
The facilitator will guide practical work and will provide one-on-one practice tuition on:

• Transferring images to the computer;
• Labelling and organisation of photographs taken;
• Management and viewing of digital images.

VI. Image edition practice
The facilitator will guide hands-on practice and will provide one-on-one practice tuition on the basic aspects of image edition, using the best option among available software (probably opensource).
VII. Tasks
Once the community researchers have learned the different photography techniques, the facilitator gives them homework (self-organised practice). Practice is an important component of photography training, and the photos taken can start complementing the inventories and digital herbarium. The facilitator and the team will organise the tasks and schedule to complete these items.

VIII. Results analysis
Following implementation of the agreed tasks, the facilitator will lead a guided sharing, review and discussion of the photographs taken. An evaluation will be carried out to assess which techniques were best understood and what technical weaknesses remain in the team of photographers. Photographs will also be evaluated in terms of usefulness for the inventories and for other educational, artistic or dissemination objectives.

Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>B. Theoretical revision</td>
<td>Day 1. 2 hours, AM.</td>
</tr>
<tr>
<td>C. Field practice</td>
<td>Day 1. 2 hours, AM.</td>
</tr>
<tr>
<td></td>
<td>Day 1. 2 hours, PM.</td>
</tr>
<tr>
<td>D. Methodological reflection</td>
<td>Day 2. 1 hour, AM.</td>
</tr>
<tr>
<td>E. Digital image management practice</td>
<td>Day 2. 2 hour, AM.</td>
</tr>
<tr>
<td>F. Image edition practice</td>
<td>Day 2. 2 hour, AM.</td>
</tr>
<tr>
<td>G. Tasks</td>
<td>Day 2, 1 hour, PM. Definition of tasks. Following weeks: completion of agreed tasks.</td>
</tr>
<tr>
<td>H. Results analysis</td>
<td>Following completion of the set tasks.</td>
</tr>
</tbody>
</table>

Equipment and materials
- Digital cameras (enough for the team of community researchers and other interested community members)
- Memory cards
- External hard disks
- Computers
- Notebooks
- Pencils or pens
- Flip chart paper, cardboard
- Projector

Methods group 6. Study of floral composition and vegetation characteristics for local landscape units
Addresses objectives:
E.1 Train community researchers in techniques for the study of floral composition and vegetation characterisation
E.2 Carry out collaborative research on floral composition of local vegetation categories

Training workshop for floral composition and vegetation characterisation

Workshop objectives
(i) Train community researchers in sampling, using previously defined techniques;
(ii) Reinforce local skills in botanical collection;
(iii) Carry out collaborative comparative vegetation studies to generate information on acahuales (secondary forests), forests and conservation;
(iv) Establish plant inventories for each landscape unit under study;
(v) Identify the presence or absence of plant species that are important for conservation in each of the distinct vegetation categories as baselines for community-based conservation.

Facilitators
The training workshop is led by an external or internal team member with expertise in vegetation studies.

Participants
Local research team and any other community member interested in vegetation and conservation issues.

Expected results
At the end of the workshop, the participants will have:

(i) Acquired the basic skills to carry out botanical sampling to characterise a plant community, using the Gentry method.
(ii) Acquired the basic skills to carry out botanical sampling of botanical families Rubiaceae, Melastomataceae and Asteraceae, as representative and indicator families of tropical vegetation.
(iii) Reflected on the usefulness of these methods to improve their knowledge of their forests and acahuales.
(iv) Technical skills to carry out studies on floristic diversity in the frame of agricultural and resource management initiatives.

General thematic content
a) Gentry method for the study of woody species in plant communities.
b) Method for the study of families Rubiaceae, Melastomataceae and Asteraceae.
c) Reinforcement of botanical collection and pressing techniques.

Learning experiences
• Group study for theoretical presentation and methodological reflection for a) and b)
• Sampling and collection practice in specific plots for a) - c)
• Hands-on practice in pressing and drying botanical vouchers for a) - c)

Session development

It is suggested the training session be organised as follows:

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical presentation
The facilitator will present the theory on the methodological and practical aspects of the following:
• The concept of plant community
• The basic mechanism of biological sampling to know a plant community: what is a transect, why the research team repeats the sample, etc.
• The Gentry method for the study of woody plants.
• The method for the study of plant families: Rubiaceae, Melastomataceae and Asteraceae. Why are these families and their characteristics chosen for botanical sampling?

Adaptations
The formal ecological method for non-woody plants concentrates on the families Rubiaceae and Melastomataceae, however, given that the Asteraceae family is very important in the Chinantla, the authors of this COMBIOSERVE protocol included it in the method. We suggest that such adaptations be carried out under other ecological conditions if necessary.

III. Methodological reflection
In conjunction with the previous theoretical revision, the group will reflect on the methods described. This will be done through a questions and answer session between the facilitator and the research team. Some important themes to reflect on are:
• Data collection to get to know the landscape as a unit.
• The objective and use of collected information.
• The importance that the training and proposed activities have for the research team and for the community in general.

IV. Technical training
• The Gentry method for the study of woody plants in plant communities is to be taught to community researchers. (See Annex 5 for a full explanation of the method)
• The method for Rubiaceae, Melastomataceae and Asteraceae families is to be taught to community researchers. (See Annex 6 for a full explanation of the method)

Adaptations
The GDF team used images to explain the different methods for studying vegetation.

When explaining the different methods, the GDF team found it very useful to make clear distinctions in the components of a given methods system and its functions. This helped to ensure workshop participants understood the basis of the methods discussed, and was useful in resolving the doubts that arose regarding the process.

It was also important to explain the full reasoning that supports the choice of transect size for each method, and why the transects are divided into different parts. It was also useful to take a couple of hours prior to the workshop to draw the transects and their components, so as to have material ready for discussion during the workshop.

Clear explanations of the methods allowed the participants to actively distribute tasks among the team according to people’s abilities and needs, resulting in an organised, efficient, and successful field experience.

V. Tasks
• Tasks are planned to practice and strengthen the acquired skills.
• In order to generate relevant information for a community these tasks must be planned with an experimental design to: a) Carry out collaborative comparative vegetation studies to generate comparable information on specific landscape units (in the present case the research team studied acahuales); b) Establish plant inventories for each landscape unit under study; and c) Identify the presence or absence of plant species that are important for conservation in each of the distinct vegetation categories as baselines for community-based conservation.
• The information collected during these activities will belong to the community and will be used for further analysis and use in decision-making processes.

VI. Methodological reflection
During the course of the workshop and field practice, the facilitator will guide a reflection about the collection methods, and the group will examine challenges and opportunities found during the practice, with a view to comparing these methods with local practice. This will be conducted through a two way (facilitator <> community researchers) question-and-answer session. For example, some of the questions that can be asked are:
- What do you think about collecting information on acahuales for future decision making?
- What difficulties do you find in the application of the methods?
- Is this information appropriate to share with community youth? Or with outsiders?

Given the social, cultural and political importance of these issues, it is important to provide time for in depth exploration of these questions, and the development of mutually acceptable answers for all of the questions that arise from the team.

### Adaptations

#### Transects
Each community researcher should choose the task that is most appropriate to their abilities, knowledge and preferences. For example, some may be more at ease with heavy physical labour such as opening gaps in the vegetation, whereas those who can read and/or write should be responsible for note-taking. It may be relevant to have regular role changes, but the GDF team found it more efficient and more acceptable to the community research team to stay in the same roles throughout the process.

The total number of transects the community research team decided to carry out was 3 per study area (acahual). All of these can be done within one day with a 9am start, a 2pm finish, and a half hour rest in the middle of the day. Rather than collect every single plant within a transect, the community research team decided to collect one specimen of each species found to facilitate the plant pressing process and avoided community researcher fatigue. If individuals of the same species were found repeatedly throughout the transect, the location of each individual was noted in the field notebook.

#### Pressing the collected plant specimens
In contrast to the transect element of fieldwork (where each participant chose a task according to their ability and preference) the GDF team found that it was important to ensure that all participants worked together on the ‘office-based’ tasks of pressing plants, compiling labels, organising the botanical specimens, filling in the computer database, etc. Having all community researchers work together on these tasks alleviated the boredom that could otherwise set in during this more sedentary phase of the research. It also was essential so that all community researchers fully grasped the time requirements for the process and the importance of order, structure and concentration to successfully complete the work.

Ideally one whole day would be destined for the ‘office-based’ phase of the process, but if the community research team is busy with other important personal or agricultural activities, the process can be separated into two half days. Time for rest during activities is important during this more cerebral phase of the work, as lack of concentration can result in sequential and time-consuming errors.

### VII. Results analysis
The analysis of the results is carried out once field practice is completed, in accordance with the research calendar. The quality of the data depends on the efficiency of the training and close follow-up of the community researchers’ field practice by the facilitator. Given the detail of the analysis proposal for methods group, it is presented as another workshop. Please see Methods Group 6 below.
### Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop preparation</td>
<td>At least 2 weeks before the workshop</td>
</tr>
<tr>
<td>A. Introduction</td>
<td>Day 1, 15 minutes, PM.</td>
</tr>
<tr>
<td>B. Theoretical presentation</td>
<td>Day 1. 45 minutes, PM. Gentry Method</td>
</tr>
<tr>
<td></td>
<td>Day 1. 45 minutes, PM. Method for the study of selected plant families.</td>
</tr>
<tr>
<td>C. Methodological reflection</td>
<td>Day 1. 1 hour, PM. Integrated to the previous theoretical presentation.</td>
</tr>
<tr>
<td>D. Technical training</td>
<td>Day 1. 30 minutes, PM.</td>
</tr>
<tr>
<td></td>
<td>• Joint planning with research team to select sampling field sites for the following day and throughout the year.</td>
</tr>
<tr>
<td></td>
<td>Day 2. All AM and part of the PM.</td>
</tr>
<tr>
<td></td>
<td>• <em>In situ</em> explanation of sampling techniques.</td>
</tr>
<tr>
<td></td>
<td>• Data collection.</td>
</tr>
<tr>
<td></td>
<td>• Botanical voucher collection.</td>
</tr>
<tr>
<td></td>
<td>• Filling information cards and formats.</td>
</tr>
<tr>
<td></td>
<td>Day 2. 2 hours, PM.</td>
</tr>
<tr>
<td></td>
<td>• Practice of plant pressing techniques.</td>
</tr>
<tr>
<td></td>
<td>• Practice of plant drying techniques.</td>
</tr>
<tr>
<td></td>
<td>Day 3. All AM and part of the PM.</td>
</tr>
<tr>
<td></td>
<td>• <em>In situ</em> explanation of sampling techniques.</td>
</tr>
<tr>
<td></td>
<td>• Data collection.</td>
</tr>
<tr>
<td></td>
<td>• Botanical voucher collection.</td>
</tr>
<tr>
<td></td>
<td>• Filling information cards and formats.</td>
</tr>
<tr>
<td></td>
<td>Day 3. 2 hours, PM.</td>
</tr>
<tr>
<td></td>
<td>• Practice of plant pressing techniques.</td>
</tr>
<tr>
<td></td>
<td>• Practice of plant drying techniques.</td>
</tr>
<tr>
<td></td>
<td>Day 4. 3 hours, AM.</td>
</tr>
<tr>
<td></td>
<td>• Talk to local experts to identify ethnospecies.</td>
</tr>
<tr>
<td>E. Tasks</td>
<td>Day 4. 3 hours, PM. Sampling work in different field plots.</td>
</tr>
<tr>
<td>F. Methodological reflection</td>
<td>Day 4. 3 hours, PM. Integrated with the work planning.</td>
</tr>
<tr>
<td>G. Results analysis</td>
<td>To programme according to the field practice progress and work organisation.</td>
</tr>
</tbody>
</table>

### Equipment and materials

<table>
<thead>
<tr>
<th>Collection material</th>
<th>Data registration materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden scissors</td>
<td>Stickers</td>
</tr>
<tr>
<td>Machete</td>
<td>Hang tags</td>
</tr>
<tr>
<td>Pole vaulting with scissors at the end of the rod</td>
<td>Report card</td>
</tr>
<tr>
<td>Transparent plastic bags (30 x 40 cm)</td>
<td>Pencils and</td>
</tr>
<tr>
<td></td>
<td>permanent black ink pens</td>
</tr>
</tbody>
</table>
Large, thick plastic bags or sacks
Botanical press
Sheets of newspaper
Three-layer corrugated cardboard
Botanical press belts
Thick leather gloves (for prickly plants)

<table>
<thead>
<tr>
<th>Measuring equipment</th>
<th>Additional equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dressmaker's tape measure</td>
<td>GPS</td>
</tr>
<tr>
<td>25 meters rope, marked at intervals of 5 meter</td>
<td>Photographic camera</td>
</tr>
<tr>
<td>Raffia</td>
<td>Magnifiers with lights or without it</td>
</tr>
</tbody>
</table>

**Methods group 6. Data systematisation and results analysis for studies of floral composition and vegetation characterisation of local landscape units**

Addresses research question F: How do we analyse our results?

**Workshop objectives**
This session aims to establish a co-enquiry framework for data systematisation and results analysis as part of the study of floral composition and vegetation characterisation for local landscape units.

**Facilitators**
This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with expertise in vegetation research processes.

**Participants**
Local research team that participated in the research process to study local floral composition and vegetation characterisation of local landscape units.

**Expected results**
At the end of the session, the participants will (i) know how to systematise their quantitative data; (ii) understand the steps required to analyse their data; and (iii) know how to draw conclusions based on their data analysis process.

**General thematic content**
- Systematising data sets
- Analysing quantitative data
- Drawing conclusions

**Learning experiences**
- Theoretical presentation, with exercises and examples, for a) and b)
- Data processing and analysis for a) and b)
- Dialogue and discussion for b) and c)

**Session development**
It is suggested the training session be organised as follows:
I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
Before discussing conventional scientific data analysis systems, the facilitator leads the group through a discussion of the possible modes of systematising quantitative data. In a co-enquiry setting, the conventional scientific processes for analysing and processing quantitative data (calculations with a high number of data, statistics, etc.) may be too time-consuming or complex for community researchers. In the Chinantla experience, the group used a combination of simple tables and graphics with two (maximum three) variables for the systematisation and analysis process. It is clear that some of the resulting analysis may lose some depth and complexity, yet it is also a system that is much more appropriate to community-based and co-enquiry processes.

III. Revision of information basis
Before proceeding to the analysis, the team recalls all the general data available and the questions that want to answer. In the Chinantla case, 18 acahuales were studied, each one with three transects to study general floristic composition and nine plots (3 per transect) to study the Rubiaceae, Melastomataceae and Asteraceae families (RUMEAS). All the data has to be available in paper (physical data sheets) or in a computer data-base. The general question was how and how much the acahuales contribute to the conservation of local biodiversity.

IV. General analysis of transects
1. If a short term study is conducted, it is likely that no scientific determination will be available for most of the plants. Scientific determination requires an expert of the region’s vegetation to be available during the fieldwork or to send voucher specimens to institutional herbaria, where considerable time has to be allocated for botanical determination. Therefore, the first adaptation for the analysis is working with ethnospecies, that is the plant organisms identified as different by the communities, named with local language or lingua franca.
2. The data of the three transects of each acahual are to be integrated in one list. That is, the team will produce only one list of floristic richness for each acahual. In this way, the team can work with one sample per acahual.
3. For the purposes of analysis, this list and selected information can be captured in
a simple table like Table 6. The research team will draw the table in a flipchart paper to make the analysis visible to all, creating one table per acahuales.

4. In the table, and based on the field data, the team will register with a mark how many times an ethnospecies is repeated. This will provide information on species abundance.

5. The team will then identify the life forms for each of the ethnospecies. This information can be used later to study the structure of the acahuales under study.

Table 6: Example of a table for general analysis of transects

<table>
<thead>
<tr>
<th>Acahuales number</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>15 years</td>
</tr>
<tr>
<td>Altitude</td>
<td>950 masl</td>
</tr>
<tr>
<td>Ethnospecies</td>
<td>Abundance</td>
</tr>
<tr>
<td>Ethnospecies 1</td>
<td>III</td>
</tr>
<tr>
<td>Ethnospecies 2</td>
<td>I</td>
</tr>
<tr>
<td>Ethnospecies 3</td>
<td>III</td>
</tr>
<tr>
<td>Ethnospecies 4</td>
<td>I</td>
</tr>
<tr>
<td>Ethnospecies 5</td>
<td>II</td>
</tr>
<tr>
<td>Ethnospecies 6</td>
<td>III</td>
</tr>
<tr>
<td>Ethnospecies 7</td>
<td>II</td>
</tr>
</tbody>
</table>

a) To analyse the ethnospecies presence and their abundance in the acahuales according to acahuales’ age, make another table in a flipchart paper that includes the floristic list of all the ethnospecies found in all the acahuales, and compares with all the acahuales grouped by age categories. These categories should be defined locally, according to the characteristics of different ages. For example, in the Chinantla case we can group acahuales from 1 to 5, 6 to 10, 11 to 15 year old, etc. To synthesise the presence and abundance of species in acahuales, review the tables of each acahuales prepared previously (Table 6). The presence of any ethnospecies in each of the acahuales group is identified with a mark, and the mark is repeated for each time the species was found in an acahuales. Note that each age group can include information from several acahuales tables (Table 7) as there may be several acahuales that belong to the same age group. See the following example.

Table 7: Example of a table where the presence and abundance of ethnospecies in acahuales age groups can be registered

<table>
<thead>
<tr>
<th>Acahuales age groups (years old)</th>
</tr>
</thead>
</table>

119
The reading and further analysis of this simple table provides information of richness (how many different) and abundance (how frequent) of each species according to the age of the acahual, that is, according to the time that the secondary vegetation started growing after the field was placed in fallow. To visualise this information separately, additional lists can be prepared of a) ethnospecies per acahual age group (richness); and b) frequency of ethnospecies in each acahual age group (abundance), which will allow the team to understand how the vegetation composition changes through time. This information is also useful to understand the plant biodiversity within and between age groups, to draw conclusions about what kind of species are those growing in the younger acahuales, and what species remain in the older ones.

A similar process can be conducted using ethnospecies in relation to acahual altitude to find out about which species grow at lower altitude acahuales, and which ones at higher altitude acahuales.

b) To visualise the vegetation structure of the acahuales of different ages, and based on the general acahual tables prepared previously (Table 7), a simple graph can be created. The research team will group all the acahual tables according to age group, count the number of trees, shrubs and vines of each acahual age group, and prepare a graph like the following one (Fig.11)
Figure 21: Example of a simple graph to visualise vegetation structure by counting the number of different life forms present in an acahual age group.

V. Analysis of RUMEAS plots

1. This analysis also uses ethnospesies as the botanical information available for short-term studies. If possible, the research team should work with scientific species.

2. The research team will integrate in one list the data on floristic richness of the three transects of each acahual. This way, the team can work with one sample per acahual.

3. For abundance data, the team will integrate data of the three plots of each transect, and register how many times each ethnospesies is repeated.

4. For the purposes of analysis, the integrated floristic list and the abundance data can be captured in a table like Table 8. The team will register with a mark how many times an ethnospesies is repeated per transect, identifying the life forms for each of the ethnospesies. The team will then draw the table in a flipchart paper to make the analysis visible to all, making one table per acahual.

Table 8: example of a table used for the general analysis of RUMEAS plots (T1= Transect 1; T2 = Transect 2; T3 = Transect 3)

<table>
<thead>
<tr>
<th>Acahual number</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>15 years</td>
</tr>
<tr>
<td>Altitude</td>
<td>950 masl</td>
</tr>
<tr>
<td>Family</td>
<td>Ethnospecies</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Ethnospecies 3</td>
</tr>
<tr>
<td>Ethnospecies 5</td>
<td>I,I,I,I</td>
</tr>
</tbody>
</table>
6. To analyse the distribution and abundance of ethnospecies belonging to the RUMEAS families according to the acahuales age group, the same process can be followed as in the general transects. The team will create another table in a flipchart paper that includes the floristic list of all the ethnospecies found in all the acahuales, and compares with all the acahuales age categories. To synthesise the presence and abundance of species in acahuales, the team will review the tables of each acahuales prepared previously (Fig. 11). Note that each age group can include information from several general acahuales tables as there may be several acahuales that belong to the same age group (Fig. 11).

The reading and further analysis of this table provides information of richness (how many different) and abundance (how frequent) of each species according to the age of the acahuales. To visualise this information separately, additional lists can be prepared of (a) ethnospecies per acahuales age group (richness); and (b) frequency of ethnospecies in each acahuales age group (abundance), which will allow the team to understand how the vegetation composition changes through time. This information is also useful to understand the plant biodiversity within and between age groups, to make conclusions about what kind of species are those growing in the younger acahuales, and what species remain in the older ones.

A similar process can be conducted using ethnospecies in relation to acahuales altitude to find out about which species grow at lower altitude acahuales, and which ones at higher altitude acahuales.

VI. Distributing the analysis work and assigning tasks
Given that the elaboration of the tables and graphics presented above can be tedious and time-consuming, once some first tables have been prepared, the research team can assign tasks and distribute the work among its members.
It is suggested that one or two brief day-long follow-up workshops are scheduled in order to (i) ensure that the systematisation and analysis process is understood and underway, (ii) answer queries and resolve problems, and (iii) explore the need for further/different questions or methods.

VII. Drawing conclusions

After finishing all the analysis tables, lists and counts, the team can draw conclusions based on the empirical data. The conclusions may be very obvious for the team after having managed all the field data in detail, but if these are not so obvious, the facilitator will help the team to elaborate conclusions by guiding the results revision and asking questions.

Following this first step, a second matrix can be used to examine whether the conclusions drawn help to answer the original research questions (Table 9). This matrix also allows for further questions to emerge, allowing the group to refine their research and interview questions prior to field-based practice.

Table 9: Data-research question comparison matrix

<table>
<thead>
<tr>
<th>Results</th>
<th>Did we answer our questions?</th>
<th>If yes, how?</th>
<th>If no, how?</th>
<th>What other questions do I have?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This process can also be visualised as in Figure 12:

Figure 22: Have we answered our research questions?
Adaptations
In the Chinantla, a further dialogue was set up to evaluate:

- What the results are telling the research team?
- How can the research team argue our points using the data and results?
- How can the research team link the results to community plans or aspirations?
- How can the research team explain our data and results to outside actors? E.g. to another community? A government? An NGO?

The local team discussed that the results are providing information on biological richness and the kind of forests. The acahuales are different, don’t have the same species, and their characteristics for cultivation are different too. These characteristics allow to take management decisions. The graphical products such as tables and charts allow to visualise the data more easily and to communicate to outside actors the empirical results.

Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 30 minutes, AM.</td>
</tr>
<tr>
<td>III. Revision of information basis</td>
<td>Day 1. 30 minutes, AM.</td>
</tr>
<tr>
<td>IV. General analysis of transects</td>
<td>Day 1. 3-4 hours, AM and PM</td>
</tr>
<tr>
<td>V. Analysis of RUMEAS plots</td>
<td>Day 2. 3-4 hours, AM.</td>
</tr>
<tr>
<td>VI. Distributing the analysis work and assigning tasks</td>
<td>Day 2. 30 minutes, AM</td>
</tr>
<tr>
<td>VI. Follow up workshops</td>
<td>Day 3 and 4. 4 hours each, AM</td>
</tr>
<tr>
<td>VII. Drawing conclusions</td>
<td>Day 5. 4 hours, AM</td>
</tr>
</tbody>
</table>

Equipment and materials
- All the physical data sheets and computer data bases from the data collecting period.
- Pencils or pens and A4 paper
- Flip chart paper
- Marker pens
- Projector and computer, if available

Methods group 7. Integrate the information generated through the above actions into community maps

Addresses objective E.3. To integrate the plant information into Community Geographical Information Systems.
E.3.1. Georeference each material or data collection in a database to be integrated with the community maps; information on local categories of vegetation and examples of useful plants will be given particular attention;

E.3.2. Integrate the information in thematic community maps – both paper and digital.

_The co-enquiry methods for this mapping component are described below (p.216-227)._
The protocol for community-based research on fauna monitoring is designed as a key tool in the process of assessing the effectiveness of community-based natural resource management. It is intended (i) to help communities assessing local fauna diversity and populations of important species, (ii) to help communities evaluating the effects that hunting practices have on the species populations, and (iii) engage in a process of collective reflection on their current needs regarding regional fauna, how these are satisfied following the current resources management and use, and what strategies they can use in case current management had to be adapted. Thus, its ultimate aim is to act as a tool for adaptive management, with an emphasis on community priorities and aspirations for their community-conserved areas and natural resource management systems.

The methods described in the protocol help build the capacities of community researchers to lead community processes of research on these issues. It is designed in such a way that following training, community researchers are able to both implement a fauna monitoring process autonomously, and help and empower their communities in their decision-making processes.

Ideally, and usually after many years of practice and reflection, co-enquiry encourages community researchers to develop *sui generis* research methods or to identify traditional methods that help to answer their research questions, in practice conventional social science research are used as a basis for the development of community-based approaches and adaptations. In the Chinantla context, researchers preferred to be taught conventional science methods that they question, test and adapt to their own realities, abilities and research questions. This highly productive work of adapting conventional methods to a co-enquiry approach is a necessary part of our collaborative work in COMBIOSERVE: as such, the Chinantec research teams adapted a selection of the methods proposed by INECOL on participatory biodiversity monitoring, also developing others they felt useful.

The overarching research questions of Chinantec communities have been developed over the course of 6 years of ethnographic, co-enquiry and community planning fieldwork, and are based on their local research needs and aspirations. The specific research questions included in this protocol are those Chinantec research questions that coincide with the project’s objectives related to biodiversity monitoring. It is particularly important that research questions are developed by the community as a whole, as this integrates the co-enquiry process into community decision-making processes rather than isolating it as a parallel process that is only fully known to the team of community researchers. The protocol for developing co-enquiry research questions is described in the Grounding Workshop on p.131-7.

The research questions developed in Chinantla communities were very varied. These included:
a) Questions for which they already have full or partial answers based on their experience and traditional knowledge:

- What animals live in our territory?
- What species of birds inhabit our territory?
- What do these animals eat?
- How do these animals move?
- What are their reproductive seasons?
- Are they harmful to agricultural production?
- Are they edible?
- Where do the animals live and where are the populations concentrated?

b) Questions for which the community desired more information which existing literature can complement:

- What animals live in our territory?
- What species of birds inhabit our territory?
- What do these animals eat?
- What are their reproductive seasons?

b) Questions for which the community desired more information which existing literature can complement:

- What animals live in our territory?
- What species of birds inhabit our territory?
- What do these animals eat?
- What are their reproductive seasons?

b) Questions for which the community desired more information which existing literature can complement:

- What animals live in our territory?
- What species of birds inhabit our territory?
- What do these animals eat?
- What are their reproductive seasons?

C. What animal species do we want to focus on?

B. What information can existing literature provide to complement our traditional knowledge?

C. How many individuals of the species selected live in our territories?

D. Where do the animals live and where are the populations concentrated?

E. How many animals can we hunt each year without affecting the populations for future hunting?

The subsequent section provides (i) an explanation of the importance of each of these research questions, (ii) the research objective related to the research question, and (iii) the tasks required to answer the question.

A. What animal species do we want to focus on?

In tropical regions of the world such as southeast Mexico, where the Chinantla is located, animal species can comprise thousands of different forms, from microorganisms, arthropods, amphibians, reptiles, birds and mammals. Any wildlife monitoring process, especially one directed by a local and small research team, must focus on a reduced number of species in order to find relevant and sound information, whilst avoiding
potentially unmanageable datasets for processing and analysis. Therefore, this first question aims to focus the community’s attention on an small group of wildlife species, using local parameters and values of selection; these can be based in cultural, economic, nutritional and environmental characteristics, among others, that the local community considers important for them.

Objective A. To identify and characterise local animals and select the most important species for monitoring based on local values, parameters and needs.

Task A.1. Train community researchers in fauna ethnoclassification exercises as a way to put in a graphical and explicit way their organisation of wildlife.
Task A. 2. Identify the main animal species and associated values through dialogue.

B. What information can existing literature provide to complement our traditional knowledge?
As mentioned above, for several of the original questions, members of the community research team and/or the community at large knew partial answers but wished to gain more information. These questions are: What animals live in our territory? What species of birds inhabit our territory? What do these animals eat? What are their reproductive seasons? In the Chinantla region, several academic institutions and non-governmental organisations have conducted wildlife studies in the past decades, but the communities have not been able to easily access to their results. On the other hand, there exist studies that provide the biological history of many species communities are interested in, although these do not provide regionally-specific information. Discovering the scientific literature on the animals they are interested in benefits the community researchers and the community as a whole, as they acquire new knowledge and are empowered through their appropriation of information generated in the region by other actors.

Objective B. To find and study the information and knowledge generated in the region by other actors in order to complement local traditional knowledge about wildlife.

Task B.1. Establish a literature review of the regional wildlife as well as information about the biological history of the species.
Task B.2. Collectively review the information provided by the external studies and contrast it with local traditional knowledge.

C. How many individuals of the species selected live in our territories?
The size of each species population is a crucial parameter to be used to various ends. For example, communities want to know population sizes in order to understand the results of community-based natural resource management and conservation initiatives (community-based conservation evaluation) on wildlife populations. They also would like to establish a base-line of populations status and trends in order to determine local harvest limits. Both in San Pedro and Nopalera, the teams chose to focus on six species
of local importance due to their cultural and nutritional characteristics: Tepezcuintle (*Cuniculus paca*), Temazate Deer (*Mazama temama*), Great Curassow (*Crax rubra*), Wild Boar (*Pecari tajacu*), Armadillo (*Dasypus novemcinctus mexicanus*), and Pheasant of Highland Guan (*Penelope nigra*).

**Objective C. To study the population size of locally important wildlife species.**

Task C.1. Train community researchers in wildlife monitoring methods for obtaining quantitative information on animal populations of selected species.

**D. Where do the animals live and where are the populations concentrated?**

Understanding population distribution, including with a temporal dimension, helps communities to understand the landscape units these populations prefer to spend time in, and where to look for more stable populations for hunting purposes.

**Objective D. To better understand the population distribution of selected species in community territories.**

Task D.1. Train community researchers in focus group methods to recover and systematise local ecological knowledge about animal population distribution in the territory.

Task D.2. Train community researchers in wildlife monitoring methods for obtaining quantitative information on animal populations of selected species.

**E. How many animals can we hunt each year without affecting the populations for future hunting?**

In the Chinantec communities where this work is being carried out, hunting is or was essential for livelihoods. It is also an important part of the local culture, particularly in terms of hunting practices, knowledge about game and environment, the belief system in which the hunting is embedded, and family nutrition. There are about 32 game species that were or are hunted mainly for food, but also for medicine or handicrafts (Ibarra *et al* 2011). Nevertheless, in 2004 the hunting practices where either self-prohibited (San Pedro) or self-regulated (Nopalera), with the aim to respect formal community conservation requirements, which follow the (limited use/prohibition) approaches of conventional conservation. However, in the Chinantla case, restrictions established on hunting are not based on population studies; moreover, information about hunting or harvest limits are not available. Therefore, carrying out locally-specific research on the harvest limits of selected species will provide valuable information for making local decisions that favour sustainable hunting.

In order to answer this question, the information obtained in objectives C and D has to be compiled. The team must also examine the factors that influence, limit or affect
animal populations; for example if there has been a drought, a disease or plague, a flood, etc. The research team can thus integrate the limiting factors over time to ensure that the hunting management approach adopted is adaptive. Furthermore, the study of spatial population distribution has to include a temporal dimension; that is, how the animals use the different landscape units over the course of the year.

**Objective E. To estimate the impact of hunting on preferred wildlife species populations.**

Task E.1. Train community researchers in hunting monitoring methods for obtaining quantitative information on animal populations of preferred species and catch per unit effort.

Task E.2. Train community researchers in information analysis to determine the harvest limits of preferred species.

**Sessions**

In this section, we describe the sequence of workshops, trainings, and ad-hoc CR support sessions required to carry out the co-enquiry process in the Chinantla. The process of adaptation and training in specific methods undertaken in the Chinantla is described in the subsequent sections. For each training session described here and further below, it is important that a selected local research team that is committed to following the training and conducting subsequent field practice is in place. The local team must be informed well in advance regarding the dates and length of the training session, which must coincide with a previously established research calendar.

In the Chinantla case, for the whole research cycle, the research team organised 4 semi-formal workshops, with several work sessions in between for systematisation and question-and-answer.

**I. Grounding workshop**

This is a 1-day workshop that addresses the first evaluation and the first approximation to the community’s research questions.

This workshop is carried out with CRs and any other interested community member according to the following schedule:

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Grounding Work sessions (Methods group 0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Theoretical and practical</td>
</tr>
</tbody>
</table>

**II. Knowledge dialogue and ethnoclassification workshop**

This is a 2-day workshop addressing the first two questions:

D. What animal species do we want to focus on?
E. What information can existing literature provide to complement our traditional knowledge?

This workshop is carried out with CRs according to the following schedule:

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Training in fauna ethnoclassification (Methods group 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Theoretical and practical</td>
</tr>
<tr>
<td></td>
<td>Identifying the main animal species and their associated values.</td>
</tr>
<tr>
<td></td>
<td>&gt; Theoretical and practical</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 2</th>
<th>Training in literature review regarding the regional wildlife (Methods group 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Theoretical and practical</td>
</tr>
<tr>
<td></td>
<td>Collectively review the information provided by the external studies and contrast it with local traditional knowledge.</td>
</tr>
<tr>
<td></td>
<td>&gt; Practical</td>
</tr>
</tbody>
</table>

III. Workshop on monitoring of selected fauna

This is a 6-day workshop addressing the following questions:

F. How many individuals of the species selected live in our territories?
G. Where do the animals live and where are the populations concentrated?

This workshop is carried out with CRs according to the following schedule:

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Training in selected fauna monitoring – visual monitoring (Methods group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Theoretical and practical</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 2</th>
<th>Training in selected fauna monitoring – visual monitoring (Methods group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Practical</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 3</th>
<th>Training in selected fauna monitoring – visual monitoring (Methods group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Practical: Methods adaptation and revision. Assignation of practical tasks for the subsequent months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 4</th>
<th>Training in selected fauna monitoring – track monitoring (Methods group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Theoretical and practical</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 5</th>
<th>Training in selected fauna monitoring – track monitoring (Methods group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Practical</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 6</th>
<th>Training in selected fauna monitoring – track monitoring (Methods group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Practical: Methods adaptation and revision. Assignation of practical tasks for the subsequent month.</td>
</tr>
</tbody>
</table>

The CRs are provided with tasks to carry out over the course of the subsequent 6-12 months (depending on the research calendar developed), throughout which a continuous support is provided by facilitators for the monitoring and systematisation process. The group also decided upon a field research schedule. It is important that the facilitator encourage the research team to meet regularly throughout this period to catch up, air ideas, help each other out, think about obstacles and opportunities, and define questions they may have for the facilitator.
IV. Workshop on hunting monitoring

This is a 3-day workshop addressing the last question:

H. How many animals can we hunt each year without affecting the populations for future hunting?

This workshop is carried out with CRs according to the following schedule:

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Training on local hunting monitoring (Methods group 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; Theoretical and practical</td>
</tr>
<tr>
<td>Day 2</td>
<td>Training on local hunting monitoring (Methods group 3)</td>
</tr>
<tr>
<td></td>
<td>&gt; Practical</td>
</tr>
<tr>
<td>Day 3</td>
<td>Training on local hunting monitoring (Methods group 3)</td>
</tr>
<tr>
<td></td>
<td>&gt; Practical: Methods adaptation and revision. Assignation of practical tasks for the subsequent months.</td>
</tr>
</tbody>
</table>

The CRs are provided with tasks to carry out over the course of the subsequent 6-12 months (depending on the research calendar developed), throughout which a continuous support is given by the facilitators for the monitoring and systematisation process. It is important that the facilitator encourage the research team to meet regularly throughout this period to catch up, air ideas, help each other out, think about obstacles and opportunities, and define questions they may have for the facilitator.

Methodologies

Methods Group 0. Grounding work sessions

Addresses all objectives: these work sessions are necessary for the implementation of all the methods subsequently discussed.

The Grounding work sessions act as introductory work, during which overall research questions are defined and fauna monitoring methods are introduced.

Participant observation

Before applying concrete methods for studying any natural resource, a general diagnosis is necessary: this is usually carried out using qualitative techniques such as participant observation and open interviews. Participant observation is the basis for any participatory research, and the method is implemented by facilitators and community researchers alike (see p.33). Participant observation requires the research team to participate in community life and general activities (subsistence, celebrations, social and even political events), and, through conversations, observation and embodied learning, gain knowledge regarding the research question, which in this case is the words, elements and limits that shape the local fauna domain. The advantage of this technique within a co-enquiry process is that community researchers have been de facto observers of the local natural and social environment their entire life! Therefore, they have good – sometimes exceptional – knowledge concerning local cultural domains.
Grounding workshop
Once the research team has gained a general understanding of the local fauna and the issues around it, a focus group with the community research team is organised to share ideas, words and limits of what to include or not in the local understanding of ‘animal domain’; and more specifically to start generating research questions regarding fauna issues. Limits are very important, as we need to determine whether some animals are of higher relevance, and others are irrelevant following local parameters and possibilities for biological monitoring.

This workshop also tackles the overall research process: its broader goal is for community researchers to understand basic (and conventional) research cycle. For the purposes of this protocol, we adapted the process to wildlife research and monitoring, however it can be used as a basis for any other research objective.

Session objectives
- To identify the animals or animals groups of interest to communities and that can be subject to monitoring and further research;
- To determine broad questions related to fauna monitoring;
- To share with community researchers the basic elements of fauna-focused research using a co-enquiry approach.

Facilitators
This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with expertise in participatory research and biological monitoring.

Participants
The community research team and any other community member interested in local fauna.

Expected results
At the end of the session, the participants will (i) be acquainted with the action-research cycle and its steps; (ii) be able to broadly identify the animals or animals groups that can be subject to monitoring and further research; (iii) have a general picture of the local needs and context regarding wildlife use and management; and (iv) have defined fauna-related general research themes or overarching questions.

General thematic content
a) Finding a common language for research
b) The action-research cycle (see Chapter III for related literature).
c) Biological research and fauna monitoring
d) Selection of animals or animals groups for further study.
e) Selection of research themes

Learning experiences
- Theoretical presentation and dialogue for a) – c)
- Dialogue and reflection for d) and e)

Session development
It is suggested the training session be organised as follows:
I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
In this section, three key concepts will be addressed:

- A common language for the research process
- The action research cycle and fauna-related research

A common language for the research process

Language is an important tool to reach a common understanding of a research process. Often external academics are used to freely deploying scientific and technical language without taking into account that most local people may not understand it. This section is not aimed at teaching or transferring the scientific and technical words to the community researchers, but rather at reaching a common understanding, between facilitators and community researchers, of how to name particular processes, objects, tools, approaches, etc.

For the purposes of this protocol, the research team proposed to determine a common language for the overarching domains of natural science research, monitoring, and wildlife. For each one of these, the facilitator promotes an exchange of ideas: dialogue is encouraged to analyse the differences between the external and the local definitions. The team’s work to define mutually understood concepts will continue throughout the workshop, as and when needed.

The proposed terms for discussion are:

1. Co-enquiry
2. Natural science research
3. Monitoring
4. Conservation

Adaptations
Throughout the workshop, a useful technique for ensuring that all participants have understood the concepts, themes and questions under discussion is to ask one of them to explain it to the others in the local language. This technique very rapidly reveals whether the participants have understood the concepts or not, even if the facilitator does not understand the local language.
5. Wildlife
6. Animals
7. Hunting
8. Any other locally important concept

The facilitator must be aware that some words may have a stronger political load and therefore may need more time to be defined. As a first result of this exercise, the team should adapt the language used during the rest of the plan research process to the one that was commonly defined.

The action research cycle
Assuming that most of the local participants have no previous experience with wildlife monitoring methods and/or the action-research cycle, in this section a presentation and explanation of both concepts is provided. A simple schema for the action research cycle using co-enquiry is provided in Figure 2.

![Figure 2: Schema for the action research cycle](image)

In order to explain this cycle it is useful to have local examples. In the case of the Chinantla the problem of rats in the corn fields was used as a local problem. Using the above action research cycle, community researchers developed a series of questions regarding the issue, and explored processes for answering those questions. The action research cycle with the example is provided in Figure 3.
This first round of questioning led to the conclusion that if there were 60 rats found over the 3 weeks of monitoring, it would be too much and the decision to trap them would be made. Sometimes, rather than a direct solution, another question appears based on the findings for the previous question: for this reason it is an action research cycle. Facilitators are encouraged to think creatively about what kinds of local problems may help community researchers think through the research cycle.

**III. Identifying research themes**

As is the case with other natural resources, the identification of research themes can be conducted through the development of an initial, general, mind map of the resources, their uses, opportunities and conflicts found in the territory. This kind of map will generate:

- A preliminary picture of the wildlife conditions;
- A landscape level analysis of wildlife management in the community territory;
- Criteria that may be useful to measure the success of the fauna management practices and strategies.

To begin with, participants will be asked to draw a map of their territory on white flipchart paper. The map should have basic geographical elements such as the community boundaries, main water bodies, main mountains or hills, the urban area, main roads, and landscape units (see Methods group 2).

Subsequently, using the map as the main tool to generate information, with the support of the facilitator, the group discusses:
- Wildlife found in each landscape unit
- General uses of the different animal species or groups
- Conflicts related to those species or animal groups
- Opportunities related to those species or animal groups

Two map layers will be created using 2 sheets of tracing paper. Resources and their uses are identified on the first layer; conflicts and opportunities on the second. When identifying conflicts and opportunities, special attention must be given to external and internal initiatives and projects that are present in, or relate to, each landscape unit. On each sheet, marks, labels, signs and icons can be drawn to identify the different elements.

Upon completion of the map, a table like the one below will be drawn on a flipchart page. For each landscape unit, the information about resources, uses, conflicts and opportunities will be registered.

Table 10: Example of information table about resources, uses, conflicts and opportunities

<table>
<thead>
<tr>
<th>LANDSCAPE UNIT</th>
<th>Wildlife species or groups</th>
<th>Uses</th>
<th>Conflicts/opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>Cats</td>
<td>Conservation</td>
<td>Jaguars can kill cattle or dogs</td>
</tr>
<tr>
<td></td>
<td>Birds</td>
<td>Food</td>
<td>Hunting restrictions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good source of food</td>
</tr>
<tr>
<td>Acahual (secondary forest)</td>
<td>Deer</td>
<td>Food</td>
<td>Lack of information about populations, and therefore we don’t really know if we are affecting the populations when we hunt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game</td>
<td>Hunting restrictions</td>
</tr>
<tr>
<td></td>
<td>Birds</td>
<td>Food</td>
<td>Good source of food</td>
</tr>
<tr>
<td>Coffee plantation</td>
<td></td>
<td></td>
<td>Hunting restrictions</td>
</tr>
<tr>
<td>Agricultural zone</td>
<td>Tepezcuintel</td>
<td>Food</td>
<td>Lack of information about populations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game</td>
<td>Hunting restrictions</td>
</tr>
</tbody>
</table>

Table 2 promotes reflection and helps in the choosing of locally relevant and interesting themes for co-enquiry. To do so, three steps are suggested:

- Dialogue about the synthesis table.
- Identification and writing down a list of broad questions that the team wants to answer.
- Prioritizing the research themes (broad questions). This can be done simply by voting on the different themes.

IV. Connecting research questions to methods
Based on the research themes defined, the group discusses what kind of data is required to answer the question, the feasibility of the research question, whether the research question can be answered by the CRs alone (or whether they need specialists), etc. The results of this discussion can be easily visualised using a table such as Table 3. Based on this discussion, the facilitator will guide the group discussion on the available methods.
for producing the data required. Here the facilitator’s expertise on the ‘pros and cons’ of different methods for achieving different types of data will be essential.

Table 11: Linking research questions to proposed methods

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Information required (what kind?)</th>
<th>Methods proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>What animals live in our territory?</td>
<td>Numerical and descriptive</td>
<td>Different observation methods</td>
</tr>
<tr>
<td>What do these animals eat?</td>
<td>Descriptive</td>
<td>Interviews with people who have knowledge on the different species Literature review</td>
</tr>
<tr>
<td>How many animals can we hunt each year without affecting the populations for future hunting?</td>
<td>Numerical</td>
<td>Monitoring</td>
</tr>
</tbody>
</table>

At this stage, rather than explain in depth what each research method is and does, the facilitator simply gives a broad outline of the approaches and the kinds of results they yield, noting that subsequent workshops will be dedicated to explaining and learning about these methods.

This is a useful moment at which to conclude, with the facilitator taking the opportunity to recapitulate on the day’s work and to ensure that most participants have understood the concepts and outcomes of the workshop.

Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 1 hours, AM</td>
</tr>
<tr>
<td>III. Defining research themes</td>
<td>Day 1. 3 hour, AM.</td>
</tr>
<tr>
<td>IV. Connecting research questions to methods</td>
<td>Day 1. 1 hour, PM</td>
</tr>
</tbody>
</table>

Equipment and materials

- Notebooks, pencils and pens
- Flip chart paper and marker pens
- Educational material to illustrate the action-research cycle
- Tracing paper sheets
- Colours
Methods group 1. Knowledge dialogue and ethnoclassification

Addresses

Objective A. To identify and characterise local animals and select the most important species following local values, parameters and needs.

Objective B. To find and study the information and knowledge generated in the region by other actors in order to complement local traditional knowledge about wildlife.

In this section, three methods are described: 1) ethnoclassification, 2) problematising dialogue and 3) literature review, all of these related to local fauna. In the Chinantec experience, we integrated the three methods in one knowledge dialogue workshop – informed by the grounding work sessions – using the following structure.

Workshop on ethnoclassification and knowledge dialogue

Session objectives

The general objective of the workshop is to train community researchers in highlighting and organising existing information about local wildlife through a knowledge dialogue that includes local ecological knowledge and available academic information about selected species.

Specific objectives:

• To train community researchers in ethnoclassification and literature review methods;
• To understand and make explicit the local categorization of representative wildlife.
• To generate a dialogue about local fauna that provides baseline information for subsequent monitoring work;
• To provide complementary technical information that answers community questions about local wildlife;
• To fine-tune local research questions about fauna in order to select those that will be answered through the monitoring process.

Facilitators

This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with practice in conducting ethnoclassification, literature reviews and problematising dialogue.

Participants

• Local research team and any other community member interested in the dialogue about local fauna.
• Special attention must be given to integrate different social groups of the community into the workshop, such as women, young people and elders, as they can provide different views of the needs and local realities.
• A special invitation should be made to local hunters.
Expected results
At the end of the session, the participants will have (i) acquired local and external information that provides a basis to answer local questions and deal with local fauna-related issue; (ii) made explicit the local categorisation of relevant fauna, (iii) acquired abilities to study local classifications of any object or living being, with special attention to wildlife; and (iv) identified the most important animals based on local values that will be subject of further monitoring.

General thematic content
a) What is ethnoclassification?
b) Identification of relevant fauna-related issues
c) Literature review – knowledge exchange
d) Fine-tuning research questions

Learning experiences
• Theoretical presentations for a)
• Practical exercises for a) – d)
• Focus groups for dialogue and analysis for a) – d)
• Graphic or power point presentations for c)

Session development
In this experience, the training session was organised as follows:

Figure 26: Framework for training community researchers in knowledge dialogue and ethnoclassification

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, how this session is part of the broader programme of monitoring or natural resources management.

II. Ethnoclassification theory and practice
Ethnoclassification exercises serve to learn how people classify a determined group of objects or elements. In this case, fauna ethnoclassification exercises are proposed; in the case of this monitoring process, the concept of ‘fauna’ includes mammals, birds, reptiles, amphibians, fishes and insects that have local cultural and economic importance. These exercises will provide language elements, local characterisation components and knowledge about local fauna, which will be used in the elaboration and adaptation of the subsequent monitoring methods. Ethnoclassification also allows community researchers to adjust and adapt the language and concepts while carrying out the literature review.
and knowledge dialogue (For more methodological information on ethnoclassification see Martin 1995, Vogl and Puri 2005, Santos Fita and Costa Neto 2009).

For the purposes of this workshop, the facilitator explains what ethnoclassification is, using examples from the daily lives of the community. This is a dialogue session in which the facilitator asks the participants to talk about instances in their own lives in which they group different objects or living organisms according to their characteristics. It is useful to ask participants to translate the concept into their own language in order to ensure a basic understanding.

We chose pile sorting as a simple but powerful method to understand local categorisations. The facilitator explains the method and asks the participants to conduct a exercise to learn it. Please see Annex 7 for a full explanation of the method.

III. Methodological reflection
Once the exercise is finished, the questions that were elaborated during the Grounding workshop are recalled and the facilitator promotes a reflection on the method used. The group then brainstorms, through a dialogue process led by the facilitator, about the pile sorting method used. Some questions that can be asked are:

- To what extent does this method help to answer our research questions?
- To what extent does the ethnoclassification exercise implemented reflect the community classification of local fauna?
- What other ways can be used to elicit local classifications?
- What other kind of data emerged through the exercise, besides local fauna classification?
- What may be the use of this kind of information?
- Should we validate and refine our results with community elders and other local experts?

IV. Problematising dialogue
Problematising dialogue allows participants to engage in a deeper reflection, further awaken interest, renew their commitment to the monitoring process, and provide further elements regarding the local relevance of the work. To conduct this dialogue, we use the methodological tool of 'Generator themes' (Freire 1975), which are key work themes around which a deep dialogue can be developed; the dialogue from there may turn to many other subjects that are important for the group. The generator themes proposed to start the problematising dialogue are: hunting, food and nutrition, community self-control, formal conservation, territory care, tradition.

Often, an object may be used to launch and facilitate a problematising dialogue using generator themes. This object may simply be a card on which the theme is written, but preference is given to one or more images related to it, as these tend to catalyse the dialogue more rapidly and concretely. From there, the conversation develops according to the group's interests. The facilitator must be very attentive to identify these interests, pose key questions and guide the dialogue to deepen the themes. During the whole process one person has to take note of all that is said during the dialogue in order to highlight the most important points in a synthesis at the end of the workshop.
V. Literature review and knowledge exchange
As with conventional research approaches, it is necessary to ground practical co-enquiry research in a solid literature review. In the case of fauna monitoring, having a literature review helps to determine existing knowledge regarding the diversity of animals in the region and to know more about the natural history of the species of interest, which will provide data on feeding patterns, reproduction, etc. The literature review process trains the team on the concept of publications as a source of information, and provides the team with a basis upon which to develop their ideas, determine gaps in their knowledge and reflect on how existing information relates to local issues and needs.

For the present case study, we looked for fauna inventories carried out in the biocultural region of the Chinantla and in the state of Oaxaca, and for the natural history of three species of greatest interest: Tepezcuintle (Cuniculus paca), Temazate Deer (Mazama temama) and Great Curassow (Crax rubra), which had been identified in the grounding workshop (Methods group 0). The amount of information drawn on for the literature review will vary depending on how well-studied a region or an ecosystem is.

In order to carry out a knowledge exchange, the information found in the academic literature has to be compared with local ecological knowledge. Thus, the problematising dialogue must continue in this section in order to promote discussion, highlight any discrepancies between published scientific literature and local knowledge, and examine the possible reasons for such discrepancies. Please see Annex 8 for a full explanation of the process.

VI. Fine-tuning of research questions
Following the literature review and the knowledge exchange between published scientific knowledge with traditional ecological knowledge, the research questions are revisited for fine-tuning. These may be adapted or modified according to new available information. The aim is to choose two concrete research questions that can be answered through field monitoring methods and processes, within the period of one year more or less (time may vary considerably, but one year is a standard period on which biological processes and populations trends can be grasped). Once the refined questions are chosen, the research team may choose to adapt a conventional scientific approach to carry out the research. However, depending on the team’s experience, community researchers may also develop *sui generis* research methods or identify traditional methods to answer their questions. The methods groups presented in subsequent sections resulted from the process described.

**Example of a work plan**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Ethnoclassification theory and practice</td>
<td>Day 1. 2 1/2 hours, AM</td>
</tr>
<tr>
<td>III. Methodological reflection</td>
<td>Day 1. 1/2 hour, AM</td>
</tr>
<tr>
<td>IV. Literature review and knowledge exchange</td>
<td>Day 2. 4 hours, AM</td>
</tr>
<tr>
<td>V. Fine-tuning of research questions</td>
<td>Day 2. 1 hour, PM.</td>
</tr>
</tbody>
</table>
Equipment and materials

- Notebooks
- Pencils or pens
- Flip chart paper
- Marker pens
- Photography sets for ethnoclassification exercises
- Adhesive labels
- White cards
- Photographs or drawings of generator themes
- Graphic, audiovisual or Powerpoint presentations for the literature review.
- Projector

Methods group 1. Training in selected fauna monitoring methods

Addresses

Objective C. To study the population size of locally important wildlife species.

Objective D. To better understand the distribution of the populations of selected species on the community territory.

Objective E. To estimate the impact of hunting on preferred wildlife species populations.

Visual monitoring
(Adapted from Ayala and Noss, 2000.)

The visual monitoring method enables the gathering of information about animal diversity and proportional species abundance. It also enables initial exploration regarding the population distribution of selected species.

Session objectives
Community researchers are able to carry out a visual monitoring process of the most common species of mammals and birds in their territory. They are also able to record animals observed during daily productive activities of farmers and hunters, as a way to evaluate the proportional abundance or three species of cultural and economic interest: Tepezcuintle (Cuniculus pacu), Temazate Deer (Mazama temama), Great Curassow (Crax rubra).

Facilitators
The monitoring training should be led by an external or local team member with knowledge and experience in fauna monitoring.

Participants
- Local research team and any other community member interested in learning how to monitor local wildlife species.
A particular invitation should be make to local hunters, with special attention to young people.

**Expected results**
At the end of the session, the participants will understand the method of visual fauna monitoring and have acquired basic abilities to apply the method and adapt it to local conditions.

**General thematic content**
- Fauna monitoring
- Visual monitoring

**Learning experiences**
- Theoretical presentation
- Practical exercises and group dialogue
- Focus groups for reflection and analysis

**Session development**
It is suggested the training session be organised as follows:

1. **Introduction**
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

2. **Theoretical presentation of the method**
The facilitator provides the theoretical background on visual monitoring and describes the practical steps for field implementation, taking note of them on a blackboard or flipchart page (see next section for detailed description of these steps):

   - Establishment of observation sites.
   - Fields walks
   - Data register

3. **Visual monitoring practice**
In order to fully understand and learn the method of visual monitoring, practice is essential. This practice can take the following shape:

   (i) Determination of watching places.

4. **Methods adaptation and revision**

**Figure 27: Framework for training community researchers in the visual monitoring method**

**Adaptations**
The establishment of observation sites works on the assumption that the members of the research team are knowledgeable and familiar with their community territory, its landscape units, and the animals that live in there. Chinantec community researchers are milpa and coffee farmers and hunters that work and walk continuously through the territory. If this is not the case, interviews to other community experts can be carried out, using the same questions, in order to determine the most favourable observation sites.
The first step is to have a group discussion to understand where animals or animal tracks have been sighted during the present year; what kind of animals have been sighted; in which landscape units animals are most commonly sighted; etc. This information will be located on a community territory map. The map can be presented in a community-wide meeting for fine-tuning. The information generated during the grounding work sessions can provide valuable data for this step.

(ii) Field walks
Field walks to the observation sites identified can be organised according to the following:

- For mammals: Direct sightings in daily walks (from 8:00 to 13:00 hrs.)
- For birds: the fixed point method is used – every species seen or heard when stopped at fixed points every 250m are registered (walks from 6:00 to 11:00 hrs.).
- Concurrently, every time that the team members carry out a field walk for hunting, agricultural activities, firewood collection, road repair, etc., they are required to record any animal information they encounter.

(iii) Data register

- To organise and analyse the information, recording it on data sheets is essential. For that purpose, the research team has to prepare a data sheet package that is useful in local conditions, allowing them to take them to the field easily while preventing the paper used from getting wet. For example, clip boards and plastic envelopes can be used.
- The community research team must adapt the data register format to local requirements, in order to retrieve the most relevant information from the field walks. The following format was proposed by Chinantec community researchers for their use:
• Data registered in paper formats are written up digitally and stored in the computer on a weekly basis, and can be analysed every month.
• The summarised or analysed data should be presented to the community assembly every 3 to 6 months, depending on the research period, so that all community members can question or complement the findings.

### WILDLIFE VISUAL MONITORING

Date: ______________________
Community ______________________
Name in Chinantec ______________________
Name in Spanish ______________________
Vegetation type ______________________
Animal seen in: milpa  acahual  forest  river  watershed  urban area
other: __________
What was the animal doing?
Animal seen:
alone  in group  if in group, number of individuals:
Weather at the time of the sighting:
sunny  cloudy  drizzly  rainy  other: ______
hot day  cold day
Coordinates:
Notes: __________________________________________
______________________________________________
Informant: ______________________________________

Figure 28: data register for visual monitoring

### IV. Methods adaptation and revision

Once the first methods practice has been carried out in the field, the facilitator encourages a discussion. The reflection can be done in a two-way questions and answers session (facilitator <> community research team). The following are some key questions that may be relevant for the discussion:

• Do you think that using this method the team can find out the population size of the species in the community territory?
• In what other ways may we learn how many animals are in the territory?
• What other data would be useful?
• What is the information gained through the visual monitoring practice useful for?
• What difficulties did we have during the field-based practice of the method?
• How can we solve these difficulties?
In addition to these suggested questions, the facilitator can draw on difficulties or opportunities that they observed during the field-based practice for further discussion during this session.

V. Task assignment
In order to have enough data for analysis and decision-making, it is suggested that this method is implemented for a whole calendar year. Having participated in the field-based practice, community researchers can work on a schedule for implementing the method throughout the year and may draw up a list of possible willing participants from the community to be invited to join in the effort.

<table>
<thead>
<tr>
<th>Example of a work plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
</tr>
<tr>
<td>II. Theoretical presentation of the method</td>
</tr>
<tr>
<td>III. Visual monitoring practice</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>IV. Methods adaptation and revision</td>
</tr>
<tr>
<td>V. Task assignment</td>
</tr>
</tbody>
</table>

Equipment and materials
- Photocopied data sheets
- Clip boards to support data sheets in the field
- Pencils or pens
- Plastic envelopes
- Flip chart paper
- Marker pens

Track monitoring

The track monitoring method is used to gather information about mammal population density and the population distribution of selected species.

Session objectives
Community researchers are able to carry out a track monitoring process of mammals in their territory. They are able to monitor selected mammals species using diverse tracks left by these animals – such as footprints, scat, marks in trees, and so on – as a way to evaluate their abundance and distribution.

Facilitators
The monitoring training should be led by a external or local team member with knowledge and experience of fauna monitoring.

Participants
- The community research team and any other community member interested in learning how to monitor local wildlife species.
• A particular invitation should be made to local hunters, with special attention to young people.

**Expected results**
At the end of the session, the participants will understand the method of track monitoring and have acquired basic abilities to apply the method and adapt it to local conditions.

**General thematic content**
- a) Mammal monitoring
- b) Track monitoring

**Learning experiences**
- Theoretical presentation
- Practical exercises and group dialogue
- Focus groups for reflection and analysis

**Session development**
It is suggested the training session be organised as follows:

Figure 29: Framework for training community researchers in the track monitoring method

**I. Introduction**
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

**II. Theoretical presentation of the method**
The facilitator provides the theoretical background on track-based mammal monitoring and describes the practical steps required for field implementation, noting each of these on a board or a flipchart page (see next section for detailed description of these steps):

- (i) Establishment of observation sites
- (ii) Carrying out transects
- (iii) Data register

**Adaptations**
The proposal presented here uses the monitoring of two important species for the Chinantec communities: Tepezcuintle (*Cuniculus paca*) and Temazate Deer (*Mazama temama*). Both have very different habits, so a single protocol cannot be established for the monitoring of both of the species. Furthermore, the research team found it was even more difficult to try to adapt the same protocol to other species, as each has different habits and biological requirements.

Therefore, good animal monitoring design requires the research teams to take into consideration the biological characteristics and habits of each species of interest. The knowledge required to establish good observation sites, identify animal scat, and be well-versed in species-specific animal habits can be drawn from local ecological knowledge and from books, specialists, field guides, etc.
In order to understand and learn the method, practice is essential, and can be carried out using the following steps:

(i) Establishment of observation sites
The first step is to have a group discussion in order to select three monitoring sites, based on community researcher experience and knowledge. These are usually sites where individuals of the selected species has been seen or hunted more frequently. Complementing traditional ecological knowledge, the species' habitat preferences helps to select the best monitoring sites. For example, Chinantec community researchers agreed, through discussion, to select three sites based on the following characteristics:

- The two species of interest for Chinantec communities (Tepezcuintle and Temazate deer) like corn, therefore milpas (corn fields) that are found close to water bodies and with dense vegetation (because these species prefer to remain hidden) are good places to start track-based monitoring of these species;
- Other foods of interest for the Tepezcuintle are mangoes and zapote mamey (*Pouteria sapota*). So, areas near to orchards or trees are also likely to be good monitoring sites.
- Tepezcuintle burrows are built mainly on stony areas and covered by vegetation, and therefore are another location to seek out for track monitoring.

(ii) Carrying out transects
- First, the group establishes a transect\(^\text{13}\) of 1 km in each of the three selected sites. There must be a minimum distance of 1 km between transects. One transect per selected site is the minimum required; however, the more transects carried out, the more robust the data. Depending on the size of the community research team, CRs can be organised in pairs, each of which will carry out one transect. This will help to reduce 'noise' and make sightings more probable.
- On a monthly basis, community researchers must walk along the three transects to register the active burrows of the Tepezcuintle. Burrows are considered active when hairs or fresh footprints are present. When one is found, its coordinates are recorded using a hand-held GPS. In the case that footprints are found and these lead to a location that is outside of the transect, that location (often a burrow) must also be marked using a hand-held GPS.
- Every two months, community researchers must walk along the three transects to count Temazate scat. The best time of the year to do this is during the dry season. In order to count scat, at the outset of the monitoring process, CRs will establish

---

\(^{13}\) A transect is a path along which one counts and records occurrences of the phenomena of study. In the present case of a track-based monitoring in the Chinantla, it is a path through forest/milpa/fallow field, of 1km, along which all relevant animal tracks are counted and recorded.
circular plots of about 10m\(^2\) every 20m along the transect; they are to collect all the scat from each plot. Every two months they return to the plots and count the Temazate scat (>5 pellets with the same characteristics is considered an individual scat) in each parcel.

(iii) Data register
- To organise and analyse the information, recording it on data sheets is essential. For that purpose, the research team has to prepare a data sheet package that is useful in local conditions, allowing them to take them to the field easily while preventing the paper used from getting wet. For example, clip boards and plastic envelopes can be used.
- The community research team must adapt the data register format to local requirements, in order to retrieve the most relevant information from the field walks. The following format was proposed by Chinantec community researchers for their use.

```
<table>
<thead>
<tr>
<th>WILDLIFE TRACK-BASED MONITORING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: __________________________</td>
</tr>
<tr>
<td>Community: ______________________</td>
</tr>
<tr>
<td>Transect number: ________________</td>
</tr>
<tr>
<td>Number of Tepezcuintle active burrows: __________</td>
</tr>
<tr>
<td>Tepezcuintle active burrows</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Burrow Number</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
```

Figure 30: Data register format for track monitoring

- Data gathering can be organised to be implemented by individuals or sub-groups. Some individuals/subgroups carry out Temazate deer monitoring while others carry out Tepezcuintle monitoring.
- Data registered in paper formats are captured in the computer after each field trip.
- The summarised/analysed data should be presented to the community assembly every 3 to 6 months, depending of the research period so that community members are given the opportunity to question or complement the findings.

IV. Methods adaptation and revision
Once the first practice of the methods field application is complete, the facilitator encourages group reflection and discussion. The reflection can be done in a two-way question and answer session (facilitator <-> rest of the team). The following are some key questions that may be relevant for the discussion:

- Do you think that using this method the team can find out the population size of the species in the community territory?
- In what other ways may we learn how many animals are in the territory?
- What other data would be useful?
- What is the information gained through the visual monitoring practice useful for?
- What difficulties did we have during the field-based practice of the method?
- How can we solve these difficulties?

In addition to these suggested questions, the facilitator can draw on difficulties or opportunities that they observed during the field-based practice for further discussion during this session.

V. Task assignment
In order to have enough data for analysis and decision-making, it is suggested that this method is implemented for a whole calendar year. Having participated in the field-based practice, community researchers can work on a schedule for implementing the method throughout the year and may draw up a list of possible willing participants from the community to be invited to join in the effort.

**Example of a work plan**

<table>
<thead>
<tr>
<th>I. Introduction</th>
<th>Day 1. 30 mins, AM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. Theoretical presentation of the method</td>
<td>Day 1. 1 hr, AM.</td>
</tr>
<tr>
<td>III. Traces monitoring practice</td>
<td>Day 1. 4 hours, AM.</td>
</tr>
<tr>
<td></td>
<td>Day 2. 4 hours, AM.</td>
</tr>
<tr>
<td>IV. Methods adaptation and revision</td>
<td>Day 3. 2 hrs., AM</td>
</tr>
<tr>
<td>V. Task assignment</td>
<td>Day 3. 1 hr, AM.</td>
</tr>
</tbody>
</table>

**Equipment and materials**
- Photocopied data sheets
- Clip boards to support data sheets in the field
- Pencils or pens
- Plastic envelopes
- Flip chart paper
- Marker pens
- Hand-held GPS

**Hunting monitoring**
(Adapted from Constantino *et al* 2008; Noss, Oetting and Cuéllar 2005; and Cuéllar, Noss and Arambiza 2004)

Hunting monitoring is used to estimate population status and trends, and is especially relevant in the case of preferred species. It is done by keeping a record of hunted animals...
in communities where hunting is an important livelihood strategy. It is also used to estimate the impact that hunting practices have on those populations; it can provide useful data on preferred species, body mass and capture per unit effort.

This monitoring method can both be used as a complement to the visual and traces methods described before and carried out independently, in line with local research questions and needs.

*Session objectives*
Community researchers are able to carry out a monitoring process of community hunting. They are able to monitor the species density of game species through the record of hunting episodes and to estimate the impact of hunting on selected species.

*Facilitators*
The monitoring training should be led by a external or local team member with knowledge and experience on fauna and hunting monitoring.

*Participants*
- Local research team and any other community member interested in the learning how measure game species populations.
- An particular invitation should made to local hunters, with special attention to young people.

*Expected results*
At the end of the session, the participants will understand the method of hunting monitoring and have acquired basic abilities to apply the method and adapt it to local conditions.

*General thematic content*
   a) Why to monitor game animals?
   b) How to conduct hunting monitoring

*Learning experiences*
   - Theoretical presentation
   - Practical exercises and group dialogue
   - Focus groups for reflection and analysis

*Session development*
It is suggested the training session be organised as follows:

![Figure 31: Framework for training community researchers in the hunting monitoring method](image)

**I. Introduction**
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.
II. Theoretical presentation of the method
The facilitator provides the theoretical background for hunting monitoring and describes the practical steps required to carry out field-based hunting monitoring, taking note of these steps on a board or a flipchart page (see next section for detailed description of these steps):

(i) Monitoring design
(ii) Carrying out interviews
(iii) Data register

III. Hunting monitoring practice
In order to understand and learn the method, practice is essential, and can be carried out using the following steps:

(i) Monitoring design
The first step in the process is to organise a group discussion about the local perception of animal populations of locally important species. The knowledge dialogue workshop may have already provided basic information. If the visual and track-based monitoring methods have already been carried out, they can provide considerable information regarding populations status. If no other method has been implemented prior, some useful questions for this purpose are:

- What animals do you think are more abundant, and where are they found?
- What animals do you think are less abundant?
- In which season are these species most abundant?
- Which are the reasons for their high or low abundance?

Based on the previous information, the research design is established by the whole research team. This design will include the kind of data they wish to register, the way in which they wish to register the data (i.e. interviews, self-monitoring, etc.) and frequency of interviews (which will be based in the local hunting frequency).

(ii) Carrying out interviews
In the Chinantla, interviews within families were chosen as the best way to gather information: community researchers carried out interviews each in their extended families. In this case, it resulted in older researchers monitoring what they and their sons are hunting, and the younger researchers monitor what their fathers and brothers are hunting. Each community researcher was responsible for interviewing between 2 and 5 nuclear families. To begin with, interviews are carried out on a weekly basis over the course of 6 months; depending on the results, this could be extended to one year.

(iii) Data register

Adaptations
The monitoring design step works under the assumption that the members of the research team are knowledgeable and familiar with animal hunting and/or animal populations. Chinantec community researchers are milpa and coffee farmers and hunters that work and walk continuously through the territory. But if it is not the case, interviews to other community experts can be conducted with the same questions.
• To organise and analyse the information, it is essential to record it in data sheets. The community research team must adapt the data register format to local requirements, in order to retrieve the most relevant information. The following format was proposed by Chinantec community researchers for their use:

```
HUNTING MONITORING

Date: __________________________
Community: __________________________
Purpose of hunt: __________________________
Number of hunters: __________________________
Species hunted: __________________________ Individuals hunted: __________________________
Weight: __________________________
Gender: __________________________
Capture place: __________________________
Did you take dogs?: __________________________ How many?: __________________________
Distance to the town (walking hours): __________________________
Notes: __________________________

Informant: __________________________
```

Figure 32: Data register format for hunting monitoring

• Data registered in paper formats are transferred for storage on the computer on a weekly basis, and can be analysed every month.

• The summarised or analysed data should be presented to the community assembly every 3 to 6 months, depending on the research period, so that all community members are given the opportunity to question or complement the finding.

IV. Methods adaptation and revision

Similar to previous methods, once the first practice of the methods field application is complete, the facilitator encourages group reflection and discussion. The reflection can be done in a two-way question and answer session (facilitator <> rest of the team). The following are some key questions that may be relevant for the discussion:

• Do you think that using this method the team can find out the population size of the species in the community territory?
• In what other ways may we learn how many animals are in the territory?
• What other data would be useful?
• What is the information gained through the visual monitoring practice useful for?

Adaptations:
Both during the hunting monitoring practice and at the moment when data is to be analysed, it is important to relate the hunting data with socio-economic variables, such as human population density, total number of hunters in the community, presence of cattle, and other similar factors that can influence hunting practice or results. These data can be gathered through ethnographic and other social sciences methods such as semi-structured interviews, as described in defined in CRP#4.
• What difficulties did we have during the field-based practice of the method?
• How can we solve these difficulties?
• What other information is necessary regarding hunted animals?

In addition to these suggested questions, the facilitator can draw on difficulties or opportunities that they observed during the field-based practice for further discussion during this session.

V. Task assignment
The hunting monitoring method is used to gather information about populations density and effects of hunting into the populations. In order to have enough data for analysis and decision-making, it is suggested that this method is implemented for a whole calendar year.

Example of a work plan

| I. Introduction | Day 1. 30 mins, AM. |
| II. Theoretical presentation of methods | Day 1. 1 hr, AM. |
| III. Hunting monitoring practice | Day 1. 4 hours, AM.  
Day 2. 4 hours, AM. |
| IV. Methods adaptation and revision | Day 3. 2 hrs., AM |
| V. Task assignment | Day 3. 1 hr, AM. |

Equipment and materials
• Photocopied data sheets
• Clip boards to support data sheets in the field
• Pencils or pens
• Plastic envelopes
• Flip chart paper
• Marker pens

Adaptations:
For all the monitoring methods proposed here – Visual monitoring, Track monitoring and Hunting monitoring – and bearing in mind the ultimate aim of established a sustainable, adaptive hunting management practie, population size is not the only parameter to be used to determine the harvest limits, but rather an indicator. Effectively, in the context of adaptive management, which belongs to an ecosystem approach, the research team should assume that there are different factors that influence animal populations that the community (the wildlife managers) must take into account. The limiting factors that may affect population size, and consequently harvest limits, are varied: these can be environmental changes like a drought, a flood, a plague or other environmental diseases. It is very important therefore, that the research process identifies these factors and that the team discusses about a) how these may impact monitoring and b) the importance on a long-term monitoring to reach an adaptive management.

Similarly, for all the methods herein, research design must include a temporal dimension as well as a spatial one. That is, although the research team studies where the animals live, move and reproduce, all this can change during different seasons throughout the year. For example, animals gather in different areas of the territory depending on the season or other environmental factors (such as those mentioned in the previous paragraph). This should be taken into account in the sampling design, by including sampling practices throughout the year.
Reforestation monitoring co-enquiry protocol

These research questions were developed in discussion between the community research team and community members, with the support of an external facilitator. The phrasing was carefully chosen by the research team so as to be easily understood by everyone in the community.

A. What is reforestation?
B. Why reforest?
C. Which plants will be reforested?
D. How will the reforestation be monitored?
E. How will the results be analysed?
F. How will the community use the results, particularly for decision-making processes?
G. How will our results encourage children to participate and get involved in the reforestation programme?

A. What is reforestation?

It is important that the community researchers and the community themselves develop a common understanding of reforestation in the context of their environment and livelihoods. In order to do so, community researchers explore both scientific principles and reasons for reforestation, as well as indigenous ideas about reforestation. It is important that local values and objectives with regard to reforestation form the basis upon which the methods are developed.

Objective A.1. To identify the local concept of reforestation

Task A.1.1. Conduct a participatory literature review on reforestation
Task A.1.2. Train community researchers in interviewing techniques
Task A.1.3. Conduct interviews to explore the local understanding of reforestation

B. Why reforest?

Once the concept of reforestation is understood, community researchers lead a community-wide dialogue on the importance of and the reasons for carrying out reforestation. This will ensure that all community members have a shared understanding of the reasons for carrying out reforestation.

Adaptation: Due to the low level of formal education in the community, research activities were carried out as a joint effort between community researchers and the on-site external facilitator. In other cases it is expected that, following appropriate training and with support, the community research team can take charge of most of the research activities.
Objective B.1. To identify the motivations for reforestation at the community level

Task B.1.1. Train community researchers in leading group discussions in order to understand community motivations for reforestation.
Task B.1.2. Create a list with information of the motivations to reforest for the local community.

C. Which plants will be reforested?

Once the importance of, and motivations for, reforestation have been shared and understood, a process must be implemented to identify the most relevant species for the reforestation program. Qualitative methods, such as freelists or focus groups, can be used to identify the most relevant species based on their local biocultural relevance.

Objective C.1. To identify relevant species to be used for reforestation

Task C.1.1. Carry out a participatory literature review on the biodiversity of local species
Task C.1.2. Implement a focus group to identify the most culturally important species within the local context

D. How will the reforestation process be monitored?

Once all aspects of the program are defined, community researchers learn how to monitor activities and results in order to ensure the continuity and effectiveness of the reforestation process.

Objective D.1. To implement a process of data collection and monitoring

Task D.1.1. Carry out a participatory literature review on data collection
Task D.1.2. Train community researchers on participatory data collection
Task D.1.3. Create tables and/or a data sheet for documenting results

E. How will results be analyzed?

The process to analyze results must be participatory; it is important that community researchers in particular are able to independently analyze the results of their work and explain their conclusions to community members as well as visitors and other external actors.
Objective E.1. To analyze the results

Task E.1.1 In order to analyze results, an ongoing process of discussion and reflection among researchers and facilitators will allow community researchers to become comfortable with using the information gathered during the implementation of activities. Information to be monitored and analyzed during the process should include:
- Number of seed sown per date
- Total number of seeds sown
- Schedule of watering the seeds
- Number of seeds germinated
- Number of days until germination

At this stage, analysis of the results should be limited to the seeds that effectively germinated. Seed selection for the next cycle of reforestation should take seed germination rate into consideration.

F. How will the community use the results, particularly for decision-making processes?

After the first cycle of reforestation, the community should gather to reflect on the research process and discuss the potential uses of the results and any changes that should be made to the reforestation program before beginning the next cycle.

Objective F.1. Using the results for the community's benefit

Task F.1.1. Facilitator and community researchers lead discussions at the community level to dialogue about the use of results at the local level and to fine tune the reforestation program.

G. How will our results encourage children to participate and get involved in the reforestation program?

To insure long term continuity of the reforestation program, community researchers should develop a plan for engaging and involving children in all stages of the process.

Adaptation: The Tsimane’ of San Luis Chico decided that the most important aspect of a reforestation program is to maintain a sustainable and diverse forest (how it used to be many years ago) for their children, therefore they discussed about encouraging children to get involved in the process and participate on the reforestation program. They decided that reforestation should be taught to them the importance of maintaining a healthy and diverse forest.
Objective G.1. To generate a plan to include children in the reforestation program

Task G.1.1. Support community researchers to design and implement workshops at the school
Task G.1.2. Support community researchers to implement field activities engaging children in each step of the reforestation program

Methodologies

Methods group 1. Qualitative methods: interviews, workshops and focus groups

Addresses objective A.1 To identify the local concept of reforestation; B.1 To identify the community’s motivations for reforestation; C.1. To identify relevant species to be used for reforestation

In order to explore the community’s understanding of what reforestation is, we recommend a process of interviewing followed by a workshop, which will ensure that the same information and knowledge is shared throughout the community. A focus group directed to people more involved with (or more knowledgeable about) the reforestation process should be lead to identify and determine the species to be utilized for reforestation.

Objectives

- Document how reforestation is understood at the local level
- Share basic information about reforestation with community members
- Identify species that are culturally important or relevant for reforestation

Participants

- Interviews: Members of the Community Research Team and a facilitator
- Workshop: Members of the local research team and all people from the village (or as many as want or are able to participate)
- Focus groups: Members of the local research team, and people identified from the interviews and workshop who have more knowledge/experience and are more interested in reforestation.
Expected results

For the interviews:
A document gathering all information regarding the concept of reforestation as understood by community members, complemented with the scientific theory of reforestation to be presented to workshop participants.

For the workshop:
At the end of the session, all participants will have a shared understanding regarding the topic of research as explained by the community research team.

For the focus groups:
Members of the local research team will gather a list of species with cultural and biological importance to be used for the reforestation program.

General thematic content

Interviews
- Document what locals understand about reforestation
- Document the reasons for implementing a reforestation program
- Document local knowledge of uses for the species reforested
- Document local perception of the past presence of the species reforested

Workshop
- What is reforestation?
- How is reforestation understood in the local context?

Focus group
- What are the most relevant/important species in the local context?
- Which species are the best ones to use (based on local knowledge and experience of working with them) on the reforestation program?
- What are the local motivations to create a reforestation program?

Session development

Interviews
It is necessary to have a group of local people, previously elected by their own community, who are committed to work as researchers. This includes spending time for training and implementation of the reforestation program. They should be well informed in advance about the length of training and implementation of the methodologies.

It is suggested the training session be organised as follows:

1. Introduction to interviewing
2. Discussion
3. Question development and testing
4. Final discussion

I. Introduction to interviewing
The facilitator will present a package of theoretical information about interviews including i) introduction to interviews, ii) types of interviews available, iii) length of the session, and iv) outcomes of the session.
II. Discussion
The facilitator will lead a discussion about which type of interview is the most adequate for the program. Once the different types of interviews have been discussed, the group determines the most adequate type of interview for the local context. We recommend that special attention be paid to semi-structured or informal interviews, as they are more adaptable and manageable for community researchers with no formal education. The protocol for co-enquiry-framed Basic Social Science research methods (p.183-227) provides an in-depth process for training community researchers in the theoretical background of semi-structured interviews.

III. Question development and testing
The facilitator guides the development of questions for the interview. Given the importance of developing precise and easily understood questions for the interview, this element of the process requires adequate time for detailed explanations and discussions. The process of developing questions can be implemented through the following steps:

• Based on the objectives of the reforestation program, the facilitator leads a discussion on the possible questions that would ensure the group would obtain the necessary results to achieve these objectives. A list of questions should be drawn up and analyzed one at a time.
• Each question should be analysed in particular in its use of language: it is important the group focus on the local lexicon to make the questions accessible to each interviewer and the people to be interviewed.
• Once each question has been analysed, it must be tested to ensure they are appropriate and understood in the local context. To do this, the community research team test the questions among themselves.
• Once questions are tested, a brief discussion to reflect on the testing is required, as this also helps to re-order or re-phrase (if necessary) the questions to make sure the process of interviewing is more fluid, simple and non-invasive.

Adaptations:
In San Luis Chico, we made sure we analysed each word in each question, to make sure they were understood in the same way by all local researchers. After selecting the specific words to be used, and making sure they are clear, we reviewed the phrase (question) to make sure everyone understood it. We also translated the question into the local language. Only one of the local researchers was able to write and read in both Spanish and Tsimane’. He was in charge of writing the questions in Tsimane’ but all researchers participated on this process by making sure they were using the right words and phrasing to make the questions understandable in the local context. Every time it was possible, besides testing the questions between the local researchers, we tested them with other Tsimane’ visiting the village, or by visiting a neighbor village, to ensure we did not affect or “prepare” people from the village to know what to expect from the questions, or prepare what to answer when it was their turn to be interviewed.

IV. Final Discussion
The facilitator will lead a final discussion about the whole process, and encourage the implementation of the methodology. The results of the discussion should be copied and saved for future discussion and review of the interviews.
This discussion should be guided by the facilitator but lead by the community researchers; it aims to:

(i) Discuss and reflect on the process of developing and testing questions.
(ii) Discuss the best way to register the information gathered during the interviews (e.g. writing, digital recordings). This includes a brief discussion about where to store the information for future analysis and reference.

**Adaptation:** Given the lack of formal education of the local researchers, the group decided to use a digital recorder to record the interview process; this required further discussion and the implementation of a brief session on how to use a digital recorder. We also discussed the ethical implications of recording someone, and the importance of asking permission to do so, while respecting and acknowledging when people did not wish to be recorded. In these cases, we decided to carry out the interview and, when possible, meet immediately after (or as soon as possible) with the rest of the local research team, to record in writing the information gathered on the interview.

(iii) Dialogue about who will be responsible for carrying out the interviews.

**Adaptation:** The community research team decided that the team member who know how to read and write would be responsible for the interviewing process, and the other members would accompany the interviews, collaborating for the process.

(iv) Decide the number of interviews expected and a time frame for carrying out the interviews.

**Adaptation:** During this discussion it was decided to interview all people (above 16 years of age) who voluntarily decide to be part of the process.

The questions used for the interviews are:

1. *Porqué es importante hacer la reforestación con la Mara?* / Why it is important to reforest with Mahogany?
2. *Cómo era la Mara antes? (cuando eras niño)* / How was the Mahogany before? (when you were a child)
3. *Cuánto había?* / How much did there used to be?
4. *Para qué se usa la Mara?* / What can Mahogany be used for?

These questions are also to be used for the reforestation of Cedar and Oak trees, which will be incorporated in the reforestation process once Mahogany monitoring is well established.

**Workshop**

It is suggested the workshop be organised as follows:
I. Introduction
The facilitator briefly presents the topic of the workshop, its length and the expected results.

II. Theoretical revision
Members of the community research team present the results obtained during the interviewing process and on the local theory of reforestation.

III. Discussion
The facilitator will encourage a dialogue among participants to discuss the topic and gather more information regarding how reforestation is understood locally.

IV. Conclusions
Members of the community research team and the facilitator will present at the final conclusions.

Example of the work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Introduction</td>
<td>Day 1 - 15 minutes, AM.</td>
</tr>
<tr>
<td>B. Theoretical revision</td>
<td>Day 1 - ½ hour, AM.</td>
</tr>
<tr>
<td>C. Discussion</td>
<td>Day 1 - ½ hour, AM.</td>
</tr>
<tr>
<td>D. Conclusions</td>
<td>Day 1 - ½ hour, AM.</td>
</tr>
</tbody>
</table>

Focus group
This focus group is intended for the community researchers and community members who have experience in reforestation or that show particular interest on participating. It is recommended to have between 6-8 participants to ensure a manageable discussion.

Adaptation: We identified a couple of people that had previous reforestation experience. And they were the only ones participating along with the community researchers, two of which also had previous reforestation experience.

It is suggested that the session be organized as follows:
I. Introduction
The facilitator will introduce the reforestation program, the main objectives of the focus group, the dynamics of the work and the expected results.

The facilitator briefly presents the theory of reforestation as identified from a literature review, complemented with information of how reforestation is understood in the local context (information obtained from first interviews). If there is need for translation, the facilitator should work in tandem with a translator (ideally a member of the community research team).

II. Dialogue
The main objective of this dialogue is the creation of a guideline to follow during the implementation of the reforestation program.

The group will discuss:
- What are the most important/relevant plant species for the people of the village;
- Which of these species are the most viable for use in the reforestation program (based on local knowledge of the species and prior experience working with them);
- What are the local motivations for a reforestation program; and therefore
- Why do you want to reforest with this species?

III. Conclusions
Results of this dialogue can be written on a flip chart, and consensus about which species to be used in the reforestation program will be drawn. If consensus is not easy to reach, further dialogue and exploration of community members' divergent opinions will be necessary.

Example of the work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Presentation of the reforestation program to be implemented</td>
<td>Day 1 - 15 minutes, AM.</td>
</tr>
<tr>
<td>B. Discussion of the most relevant/important species to be used in the program</td>
<td>Day 1 - 1 hour, AM.</td>
</tr>
<tr>
<td>D. Conclusions</td>
<td>Day 1 - 30 minutes, AM.</td>
</tr>
</tbody>
</table>

Equipment and materials needed (for workshop and focus groups)
- Notebooks
- Pencils or pens
- Markers
Method 2. Implementing reforestation monitoring: data collection (focus groups)

Addresses objective D.1. To implement a process of data collection and monitoring

Objectives
- To implement training sessions with the community researchers
- To create a format for data collection

Facilitator
An external researcher

Participants
Local community researchers

Expected results
Throughout the sessions it is expected to create a format for data collection elaborated by the participants to be used for data collection and monitoring.

General thematic content
- What is data collection and its importance in the context of reforestation
- How to collect all the data required

Session development
Work should be implemented utilizing focus groups among the CRs. It is recommendable to plan at least a couple of sessions to be able to review the entire process and to create an effective data collection sheet.

It is suggested that the session be organized as follows:

I. Introduction
The facilitator will introduce the topic, explain the dynamics of the work, and expected results.

The introduction should include an explanation of the importance of collecting data, maintaining it accessible at all times, and that collected data should be easy to understand for everybody involved on the program, including community members. Therefore, the data collection process devised should be in a format that it is easy to understand and manage for all participants.

II. Development of the data collection sheet
The facilitator should encourage the participants to discuss and elaborate a data collection format that is easy to understand and effective, including all aspects of data intended to collect. For this, the facilitator could base the discussion on the protocol elaborated on the previous focus group, and follow some questions as:

- What information about the species would you like to register?
- What steps of the protocol elaborated (reforestation protocol) should be registered, and why?
- How do you think we can register them?
- What information you consider important to register to contribute on the continuity of the program?

Following the questions the group reaches an agreement regarding what should be registered and why. Based upon this decision, they work on creating a table to document all the data of interest.

III. Conclusions
Throughout the sessions a data collection sheet should be created and reviewed to be use by the participants in the reforestation program.

Table 12: An example of the data collection sheet created with the Tsimane' villagers of Bolivia, including some data.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th># of seeds sown</th>
<th># of seeds germinated</th>
<th># total seeds sown</th>
<th># days it took for germination</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/25/13</td>
<td>X am</td>
<td>260</td>
<td></td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>09/26/13</td>
<td>X pm</td>
<td>88</td>
<td></td>
<td>348</td>
<td></td>
</tr>
<tr>
<td>09/27/13</td>
<td>X pm</td>
<td>132</td>
<td></td>
<td>480</td>
<td></td>
</tr>
<tr>
<td>10/07/13</td>
<td>Very humid</td>
<td>A number germinated that were sown on 09/25/13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/08/13</td>
<td>X pm</td>
<td>Some sown on 09/26/13</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/11/13</td>
<td>X pm</td>
<td>More germinated from those sown on 09/25/13</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/15/13</td>
<td>rain</td>
<td>Some sown on 09/26/13</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td># of seeds sown</td>
<td># of seeds germinated</td>
<td># total seeds sown</td>
<td># days it took for germination</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>-----------------</td>
<td>----------------------</td>
<td>-------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>10/25/13</td>
<td>V humid</td>
<td>184</td>
<td></td>
<td>664</td>
<td></td>
</tr>
</tbody>
</table>

**Method 3. Results analysis**

Addresses objective E.1. To analyze the results

**Objectives**

To create a consensus regarding the significance of the results and of the importance of their analysis

**Facilitator**

An external researcher

**Participants**

Local community researchers

**Expected results**

At the end of the session participants will understand and be prepared to analyze the data collected during the reforestation program

**General thematic content**

- What is data analysis?
- What should be analyzed and why?

**Session development**

Work should be implemented in discussion sessions throughout the process of data collection, using the focus group approach (among community researchers)

It is suggested that the session be organized as follows:

1. **Introduction**

   The facilitator will introduce the topic, explaining the importance and meaning of data analysis during a reforestation program, and expected results.

   **Adaptation:** In the San Luis Chico context, we needed to explain the importance of analysing the data emerging from the entire process of reforestation (from sowing seeds to transplanting plants to the forest) in order to understand what was successful and what was not. An explanation of how data analysis works allowed us to investigate the effectiveness of
seeds and to examine how much time was spent on each activity. This enabled us to demonstrate the work involved throughout the whole process, ensuring that community members were aware of what to expect during a second cycle. The data analysis process also helped participants understand what they should be paying more attention to: for instance, they found that if fallen leaves covered the seeds that were sown, germination may not occur. Therefore it was decided to install a net over the seeds to control this during the subsequent cycle.

II. How to analyse data

Based on the discussion that emerged during the development of the data sheet (Method 2, above), CRs should be encouraged to engage in a discussion aiming to decide how to analyze the results, focusing on the level of detail for the analysis.

The group should:

i. Review all data collected on the data sheets, to respond the question: What kind of results are expected from the reforestation programme?

ii. Discuss about which results should be analysed and why (i.e. Evaluate the number of seeds sown: how many germinated, and how long it took).

iii. Discuss how to analyse the data collected (i.e. Evaluate the time that takes the seedlings to reach a proper size, since germinated, to be replanted on the forest).

iv. Calculate effectiveness of germination from the number of seeds germinated from the total sowed to be able to plan for next season.

III. Conclusions

Results of the activity will be taken note of by the facilitator and use as a permanent tool for discussion throughout the process of data collection. All analyses can be reviewed, refined, and re-structured by the community researchers at any time when needed.

Method 4. Using the results of the research process (workshop)

Addresses objective F.1. Using the results for the community’s benefit; and G.1. To generate a plan to include children in the reforestation program

Objectives

- To identify and document potential uses of the results
- To plan a program for engaging children

Facilitators

Community research team and a external advisor

Participants

Members of the community and authorities

Expected results

A the end of the session is expected to have a list of uses of the results and a plan for children activities to insure their involvement on the reforestation program
**General thematic content**

- What are the possible uses for the results?
- What children activities are most appropriate?

**Session development**

The workshop should include when possible authorities, and all community members. Work should be lead by CRs, who encourage dialogue among all participants.

It is suggested the session be organized as follows:

1. **Introduction**
   The facilitators introduce the theme, making a detailed presentation of the reforestation program – particularly results, analysis and progress to date – explaining the importance of the continuity of the program to ensure its effectiveness. The facilitators explain that the continuity and effectiveness of a reforestation programme is based on its long-term nature, and therefore that it is important to involve community youth and children to maintain the programme in the future. The facilitators also explain the benefits of having a reforestation programme not only as a tool for forest conservation, but also as an educational tool for children to learn how to conserve and manage the forest. The facilitators then introduce the dynamics for the session, and expected results

2. **Dialogue and development of proposals**
   Once the workshop participants are acquainted with the up-to-date results and analyses emerging from the reforestation process, they can discuss the following questions: The group will discuss:
   - What are the possible uses of the reforestation results?
   - What activities should be adequate to implement with children in the local context?

   The community research team should lead this discussion. It may be useful to have breakout discussions in small groups in order to explore each of these questions in depth. The participants can be separated into two groups each discussing one question; a spokesperson can then present the results of the discussions for further dialogue during a plenary session. The facilitator should take note of the responses from each group to lead this final dialogue, with a view to reaching an agreement on the most representative responses and the next steps for implementation.

3. **Conclusions**
   The results of this activity should be taken note of by the facilitator on a flip chart. A two-fold plan should be drawn up regarding uses of the results and a strategy to engage children in the program. This plan should be drawn up to be implemented as an ongoing process.
Fishing monitoring co-enquiry protocol

The objective of the fishing monitoring protocol is to support communities to carry out their own monitoring of their river fishing activities. Community researchers and community members developed these research questions together, with the support of an external facilitator.

A. What is monitoring?
Knowledge and understanding of what is monitoring, and how can it be implemented is necessary to begin the process.

Objective A.1. To understand what monitoring is
Task A.1.1. Conduct a literature review on monitoring
Task A.1.2. Implement discussion sessions to discuss the meaning of monitoring

B. Why and for what should we carry out fishing monitoring?
Before planning activities, it is important to discuss and understand why monitoring the fishing activities is important at the local context, and how the local community will benefit from monitoring program.

Objective B.1. To identify the local importance of a fishing monitoring program
Task B.1.1. Document the motivations for a monitoring program
Task B.1.2. To document benefits envisioned by locals by the implementation of a fishing monitoring program

C. What fish should we monitor?
Once identified the motivations, benefits and importance of a fishing monitoring program, identification of the most locally relevant fish is needed to start the program.

14 Given time constraints the final steps of this protocol were not fully implemented in the field; they are presented here as suggestions.
Objective C.1. To identify the most important/relevant fish to be monitored

Task C.1.1. Literature review of the fish in the region
Task C.1.2. Focus group to identify the most relevant fish in the local context

D. How will we carry out the monitoring?
Having identified the fishes to be monitored, its time to understand and decide how to monitor the fishes and the fishing activities

Objective D.1. Elaboration of a guideline for the process of data collection

Task D.1.1. Discuss and elaborate a monitoring plan: how to collect the data and the frequency of data collection
Task D.1.2. Create a data sheet for data collection

E. How will we analyse our results?
Once monitoring is organized, a process of understanding how to analyze results should start during the first cycle of monitoring (six month or one year).

Objective E.1. To analyze the fishing monitoring results

Task E.1.1. Literature review
Task E.1.2. Analysis of results

F. How will our results be used by the community?
During the first cycle of the monitoring process (six months or one year), discussion within the community research team should be encouraged to discuss ways of using the results obtained, and other potential outputs (publications, etc.)

Objective F.1. To explore the usage of the monitoring within the community

Task F.1.1. Lead sessions of discussion to gather information about the potential outputs from the results and how the latter can be used – both in practice and in decision-making.

Methodologies

Methods group 1. Qualitative methods
Addresses objectives A.1. To understand what monitoring is; B.1. To identify the local importance of a fishing monitoring program; C.1. To identify the most important/relevant fish to be monitored and D.1. Elaboration of a guideline for the process of data collection

In order to have a common understanding of what monitoring is, how can it be done, and what the local importance of having a monitoring program is, we recommend that the work begin with an informative workshop, followed by focus groups based on discussion sessions.

Objectives
- To document what is understood locally as ‘monitoring’
- To share information about what is a monitoring programme and why it is important to carry one out
- To identify locally relevant fish to be monitored

Facilitators
For the workshop: This should be lead by a member of the community research team with the ability to manage a group, and with the support of an external researcher.
For the focus groups: Guided by an external researcher and carried out within the community research team, and other ones lead by community researchers and carried out with people from the village.

Participants
Workshops: Members of the community
Focus groups (a): Community researchers
Focus groups (b): Select members from the community who are more experienced on the topic (fishing), and/or have more interest

Expected results
i) For the workshop
At the end of the session is expected that the participants will have basic knowledge of the theory of monitoring, how is understood locally and why it is necessary to implement it in the community.
ii) For focus groups (a)
Sessions among the community researchers should end with a basic document about the concept of monitoring to be used during the implementation of the programme as well as its possible/expected goals.
iii) For focus groups (b)
Sessions of discussion should come up with a list of the fish most relevant, important or more common fish locally harvested, as these will be the ones used in the monitoring programme.

General thematic content
Workshop
- Document local understandings of monitoring
- Document local reasons for implementing a monitoring program

Focus group (a)
• Obtain a consensus about the concept of monitoring
• List the benefits and goals of a monitoring program at the local context
• Creation of a protocol of work to implement a fishing monitoring program
• Create a table for data collection

*Focus group (b)*
• Document local historic information about the fish population in the community
• Document changes identified through the years about the fishing activities

**Session development**

**Workshop**
Before starting, it is important to have selected a group of people from the community who are going to be the local researchers. This group should be aware of the time and work required to be able to carry out a monitoring programme, and that it is important to be very committed on participating on the research team to benefit their own community.

It is suggested that the session be organized as follows:

1. **Introduction**
The facilitator will present the workshop, explain details about timing, format, and expected results.

2. **First discussion**
The facilitator will invite participants to engage in a discussion about the concept of monitoring. The discussion should be facilitated in such a way as to ascertain that the concept of monitoring is well understood, and if there is a consensus among the villagers about the topic.

   Possible questions to guide the discussion:
   - What do you understand by monitoring?
   - Has the fish population and diversity changed over the past 5-8 years?

**Adaptation:** During the workshop, it was clear that the term 'monitoring' was not understood by all community members: diverse perspectives emerged on the topic and the community research team used these perspectives to develop one unified concept. Therefore, in the context of the San Luis Chico fishing monitoring programme, monitoring is understood as "seeing and following a process for some time".

3. **Introduction to monitoring**
The facilitator should make a brief presentation about the concept of monitoring based on literature reviews. The presentation should provide appropriate and understandable
information to feed into the discussion, with the objective of obtaining an agreed and clearly expressed concept of monitoring. The concept thus developed will be used for the implementation of the program.

IV. Second discussion
Once the idea of monitoring has been defined by the participants, the facilitator guides a dialogue about the main reasons and motivation of villagers to implement a fishing monitoring programme. Some questions useful to lead this discussion are:
- Why are you interested on monitoring fishing activities?
- How important is fishing for the community?
- How do you think it's possible to monitor the activities?
- Are you all willing to contribute on the program?

V. Conclusions
The facilitator should point out important topics from the discussions, and present the final conclusions (the monitoring concept to be adopted).

Adaptation: In San Luis Chico, the community agreed that the community researchers would be responsible for disseminating information and knowledge generated during the workshop and to respond to any specific queries community members may have. They would also be responsible for ensuring that all community members understood the purpose and process and to maintain consensus among the community regarding the fishing monitoring programme.

Example of the work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Introduction</td>
<td>Day 1 - 10 minutes, AM.</td>
</tr>
<tr>
<td>B. First discussion</td>
<td>Day 1 - ½ hour, AM.</td>
</tr>
<tr>
<td>C. Introduction to monitoring</td>
<td>Day 1 - ½ hour, AM.</td>
</tr>
<tr>
<td>D. Second discussion</td>
<td>Day 1 - ½ hour, AM.</td>
</tr>
<tr>
<td>E. Conclusions</td>
<td>Day 1 - 15 minutes, AM.</td>
</tr>
</tbody>
</table>

Focus groups

When working with community research teams, focus groups can be used both as a training platform and a space for discussion between participants about the complete process of monitoring. Focus groups should be carried out regularly to stimulate discussion and interaction between participants.

It is suggested that the session be organized as follows.
I. Introduction
The facilitator (external researcher) explains the dynamics, estimated time for work, and so on.

Following the structure proposed in this document, the first focus group (a) should focus on discussing the results obtained during the workshop with the community and to discuss the benefits and goals for the programme. The second focus group (b) should focus on the discussion and creation of a guideline (protocol) for the implementation of the monitoring programme and also the creation of a data collection format.

The facilitator makes a brief presentation of the results from the workshop, and, unless the community research team have questions they wish to launch for the discussion, the facilitator may suggest a few (see II. below). The participants should be motivated to engage in a dialogue and discussion to document historical information about fishing, and the changes observed through time.

For both activities, a brief introduction of monitoring examples and how to collect data is recommended to encourage discussion.

II. Discussion
Focus Group (a)
Some questions for the discussion among participants in the first focus group could be:

- What do you think about the ideas regarding monitoring proposed by community members? Do you agree/disagree?
- Base on the first question, what do you (as a group) think of monitoring?
- Why do you consider important to work on fishing monitoring?
- How would a fishing monitoring programme benefit your community?
- What do you expect to obtain from a monitoring programme?

**Adaptation:** During the discussion the questions proposed here emerged; the group took the time to explain each question in detail. They reviewed the ideas surrounding monitoring that emerged during the workshop, and the discussion delivered the following objective for the fishing monitoring process: "To describe the process and activities for fishing and document/monitor them”

Continuing with the discussion, or in different sessions, it is necessary to create a protocol to be able to implement the programme and a table for data collection. The following table provides an example of the table of data collection developed with the Tsimane' community of San Luis Chico.

Table 13: Fishing monitoring data collection table for use by fishers in the community

<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>Fishing dates</th>
<th>Number of fish of each</th>
<th>Fishing method</th>
<th>Time of fishing</th>
</tr>
</thead>
</table>
Adaptation: In San Luis Chico in Bolivia, the team carried out another two discussion sessions among community researchers. During the first session, they created a protocol to implement the fishing monitoring programme based on their shared traditional knowledge surrounding fishing activities. During the second discussion session, they developed a data collection table and decided to collect data three times per week by visiting all the village households.

Focus Group (b)
A dialogue is expected among participants, with the aim to gather information on the history of fishing practices and on fish diversity and richness in the region, as well as on the main changes in fishing and fish populations observed by locals over the years.

Questions to launch the dialogue include:
- Have fishing techniques changed through the years? In what way?
- Do you still fish as with the same frequency as when you were a child?
- When fishing, do you fish more or less than about 10 years ago?
- How is the fish population now compared to when you were a child?
- Can you still fish the same types of fish as when you were a child?

III. Conclusions
The facilitator presents a list of conclusions emerging from the discussion sessions. These conclusions should include the final versions of the concept of monitoring adopted by locals, the protocol to implement the monitoring programme and the data collection table.

Ideas: This fishing monitoring programme can also be used as a tool by Tsimane’ people to defend their rights to sustainable fishing for their own consumption.

Methods group 1. Analysis and use of results
Addresses objectives: E.1. To analyze the fishing monitoring results and F.1. Lead sessions of discussion to gather information about the potential outputs from the results, and all uses for the results.

Objectives
- Identify a method to analyze the results (Focus group (c))
- To document potential uses for the results (Focus group (d))
**Facilitators**
A community researcher capable of managing a group activity would ideally lead this focus group discussion. In this case, the external facilitator and one of the community researchers led the focus group together.

**Participants**
Focus group (c): Local community researchers
Focus group (d): Local community researchers and community members

**Expected results**
Focus group (c): A method to analyze results will be elaborated
Focus group (d): A document listing the possibilities for uses of the results from the fishing monitoring programme

**General thematic content**

**Focus group (c)**
- Discussion about which results are important for analysis
- Training sessions to learn about data analysis
- Analysis of results

**Focus group (d)**
- Discussion about potential uses for results
- List of potential uses of the results

**Session development**

**Focus groups**
Focus groups are intended to serve as a training platform as well as a space for discussion between participants to identify the most relevant results, and how to analyze them. Focus groups should be carried out regularly to stimulate discussion and interaction between participants.

It is suggested that the session be developed as follows:

1. **Introduction**
   Facilitators should present the topics, time for work and expected results. This focus group should utilize the data collection table prepared for the monitoring program as a platform for work. All results already collected should be reviewed, and complemented as needed.

   **Adaptation:** During the early sessions, after reviewing the data collection sheet, the group decided to tweak it to ensure that everyone understood how to write the results and interpret the table. Once reviewed and corrected, the data collection table was tested for another few sessions before being considered final.
II. Discussion

Focus group (c)

Based on a discussion led by facilitator(s), the intention of this session is to come up with a plan pointing out which results should be analyzed and how. A detailed yet easy to follow approach is essential.

Adaptation: The San Luis Chico team decided to analyse the number of fish harvested per household per month and the number of fishing trips per household per month. In previous discussions regarding the fish species to feature in the programme, the community researchers decided to begin by analyzing only fish counts and number of fishing trips. However, they wished to being training activities to help them differentiate and identify different species of fish based on local knowledge, classifications and descriptions. Time limitations prevented us from carrying out this training for the present project.

Focus group (d)

The facilitator encourages a discussion to document the local views about potential uses of the fishing monitoring programme results.

Adaptation: In the case of San Luis Chico, the question used to start the discussion was: Why do you want a fishing monitoring programme and what do you think you will do with the results? The results were:
- We want a monitoring programme to find out how much we are actually fishing in order to demonstrate (in particular to the Pilon Lajas park rangers) that we do not overfish and that all our catch is for our own consumption
- We want to find out why there are times when fish are abundant and times when fish are scarce.

III. Conclusions

Conclusions adopted for each focus group should be documented and presented to all participants.

Focus group (c)

For this focus group, the conclusion includes brief presentation recapitulating the results expected and what each dataset to be analysed should look like.

Focus group (d)

For this focus group, the conclusion includes a list of uses for the results. These will help the community begin planning strategic approaches to present the results to the community and other actors.
Co-enquiry research on socio-environmental change

The protocols described in this sub-section were designed to share a co-enquiry approach to classic social science research methods as well as innovative approaches for working on the topic of change in the context of efforts to assess the effectiveness of community-based natural resource management.

These methods, applied in a co-enquiry process, are designed to help communities (i) Assess the livelihoods and environmental impacts (positive and negative) of their community-based natural resource management regimes, including external governance regimes; (ii) Engage in a process of collective reflection on their current livelihood and wellbeing conditions, how these may change in the future, and what strategies they can use to cope with or adapt to possible future changes; and (iii) Make better decisions to help provide for bioculturally sustainable livelihoods and territories into the future. Thus, its ultimate aim is to act as a tool for adaptive management, with an emphasis on community priorities and aspirations for their community-conserved areas and natural resource management systems.

In the case of all co-enquiry research processes, is important that the research questions are developed by the community as a whole (or developed by a group of community researchers and validated by the community in an assembly), as this integrates the co-enquiry process into community decision-making processes rather than isolating it as a parallel process that is only fully known to the team of community researchers. In the case of these protocols for social science research, the research questions were developed using the problematising dialogue process, discussed both above in Chapter II and below, in the protocol itself.

The research questions developed in Chinantla communities are:

A. What major changes (in land use, politics, society, the environment, etc) have occurred in the community in the past 20 years?

B. What is driving these changes?

C. How have these changes impacted our livelihoods and wellbeing?

D. What are we doing to deal with these new threats? How are we using the opportunities?

E. Given our previous analysis, what are the possible future scenarios for our livelihoods and wellbeing under changing conditions (environmental, social, political, etc)?

F. What can we learn from these results and how can we ensure our livelihoods, biocultural sustainability and wellbeing in the future?
The subsequent section provides (i) an explanation of the importance of each research question, (ii) the research objective related to the research question, and (iii) the tasks required to answer the question.

**A. What changes have occurred in your community in the past 20 years?**

In the Chinantla context, community conservation and Payments for Environmental Services (PES)\(^{15}\) are the most important changes in the context of community-based natural resource management, and are therefore of greatest interest to them for the purposes of this research.\(^{16}\) They are also indivisible, given that communities engaged with community conservation in order to obtain PES – in effect most community members refer to PES as ‘*la conservación*’ (conservation). However, given the broad nature of the guiding questions, the resulting protocol can easily be adapted to a diversity of contexts wherein communities seek to assess the social effectiveness of community-based natural resource management.

While it may be that the major changes the community has seen over the past 2 decades relate to land use, community-based conservation and PES, it is necessary to unpack the influence of all the factors that people describe as contributing to changes. For example, a determining factor in improved economic wellbeing may be household members’ migration to the US, which may be influenced by fluctuations in crop harvests or prices, which in turn may be influenced by changes in the climate, and so on. On the other hand, receiving cash through PES may be influencing patterns of migration to the US, which in turn may have an impact on agricultural production and/or what kind of food is consumed in the household. Here, what is important is to understand what community members *perceive* as the major changes.

**Objective A. To document the most important changes in community life according to its members.**

Task A.1 Train community researchers in semi-structured interview methods for obtaining qualitative information on individual’s perceptions of the changes occurring in their communities.

Task A.2 Train community researchers in oral history documentation as a way of obtaining qualitative information on the drivers of the principal changes in community life.

Task A.3 Train community researchers in participatory mapping of their biocultural territory with a view to bringing those maps into dialogue with existing historical land use and land use change maps.

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\(^{15}\) In the Chintantla, communities have been receiving payments for hydrological services since 2004. The receipt of these payments was presented to them as dependent on their certifying large portions of their territories as Voluntary Conserved Areas (VCAs). The two interventions are thus considered ‘the same thing’ by community members, who are increasingly unhappy with the restrictions placed on them – with significant livelihoods consequences – as a result of the VCA certification and the PES requirements. See Martin et al (2010) and Ibarra et al (2011) for more information on the Chinantla socio-environmental context.

\(^{16}\) The steps followed to reach this conclusion are described in detail in Chapter III, under the section ‘Assessment of research needs and core themes’
B. **What is driving these changes?**

Once the community has established what they agree the major changes in their community are, it is important to begin exploring what the drivers of these changes are. In practice, this question will be addressed in tandem with question A.

<table>
<thead>
<tr>
<th>Objective B. To document the drivers of these changes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task B.1 Train community researchers in semi-structured interview methods for obtaining qualitative information on the drivers of the principal changes in community life.</td>
</tr>
<tr>
<td>Task B.2 Train community researchers in focus group methods for obtaining qualitative information on the drivers of the principal changes in community life.</td>
</tr>
<tr>
<td>Task B.3 Train community researchers to carry out a problematising dialogue process to analyse information from locally expert community members (specifically elders) on the changes they have witnessed over the past 20 years. The problematising dialogues will use the maps produced during Task A.3 as props.</td>
</tr>
</tbody>
</table>

C. **How have these changes impacted our livelihoods and wellbeing?**

Given the qualitative nature of our research programme, it is likely that some information on community members’ perceptions of how changes are related to wellbeing will have emerged under the previous question. However, for the purposes of this question, the research team sought to explore more specifically the current circumstances of community members.

<table>
<thead>
<tr>
<th>Objective C. To document current livelihoods and wellbeing status among community members and changes in this status over time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task C.1 Train community researchers in semi-structured interview methods for obtaining qualitative information on individual’s current livelihood strategies, perception of their current wellbeing, and perception of the impact of the changes they identified previously on their livelihoods and wellbeing.</td>
</tr>
<tr>
<td>Task C.2 Train community researchers in participatory mapping of strengths, vulnerabilities, opportunities and threats.</td>
</tr>
<tr>
<td>Task C.3 Support community researchers to carry out a System Operator process for the systematic analysis of the consequences of changes for community livelihoods, wellbeing, and governance. The maps produced during Task C.2 will be used as props during these problematising dialogues.</td>
</tr>
</tbody>
</table>

D. **What are we doing to deal with these threats? How are we using these opportunities?**
Based on our understanding of the positive and negative impacts for livelihoods and wellbeing of community members, the research team sought to explore how they are coping and dealing with, or even taking advantage of these changes.

**Objective D. To document community members’ approaches to deal with impacts and utilize opportunities arising out of the changes their community is facing**

Task D.1 Train community researchers in semi-structured interviews to document community members’ approaches to deal with impacts on livelihoods and wellbeing, and use of opportunities arising out of community conservation, PES, and other changes that affect them.
Task D.2 Train community researchers to carry out a problematising dialogue process to discuss how the community deals with impacts and utilizes opportunities arising from the changes named in the previous exercises.

**E. Given our previous analysis, what are the possible future scenarios for our livelihoods and wellbeing under changing conditions (environmental, social, political, etc)?**

With the results of questions A-D in hand, the community can gather together for a workshop to reflect on these results and discuss their options for the future under different scenarios of governance and environmental change. In particular, this collective process includes a scenario-building exercise.

**Objective F. To explore possible trajectories of change under diverse future environmental, social, political and other scenarios**

Task F.1 Train community researchers to analyse the results of the mapping exercises and problematising dialogues, and to present these results in a clear and synthetic manner to their communities.
Task F.2 Support community researchers in carrying out a System Operator process in order to explore the possible future scenarios for community wellbeing under different governance regimes, and social, political and environmental conditions.

**F. What can we learn from these results and how can we ensure our livelihoods, biocultural sustainability and wellbeing in the future?**

It is important that the results and conclusions drawn regarding all the above questions are shared with the community as a whole, and that all are invited to participate in a dialogue and reflection on how they can be used to improve community decision-making.
Objective E. To support community efforts as members reflect on the connection between research results and community decision-making processes.

Task E.1 Train community members to lead a problematising dialogue process in order to reflect on the relationship between their current problems, the research results and future decision-making processes.

Task E.2 Train community researchers in leading a workshop-based community process of reflection on: (i) how community conservation, PES and other recent governance and land use changes impact their livelihoods and wellbeing, and (ii) how these research results can be used to improve community decision-making processes.
Basic social science research methods: semi-structured interviews and oral histories, focus groups and workshops, and participatory mapping

In this section, we cover in detail the various basic social science methods tested in a co-enquiry process in the Chinantla fieldsite: semi-structured interviews and oral histories, focus groups and workshops, and participatory mapping. In order to implement these social science research methods, we suggest the implementation of a one day ‘Grounding workshop’, which helps to ensure a common language is being spoken, introduces action research concepts, establishes the research questions, and introduces briefly the methods the research team will learn over the course of the process.

Grounding workshop
The Grounding workshop acts as an introductory workshop, during which overall research questions are defined and social science research methods are introduced.

This workshop tackles social science research processes as a whole. It discusses what social science research is and how it differs to natural science research, explaining in particular the importance of narratives, participant observation, triangulation, etc. It explains the difference between qualitative and quantitative research methods, data, and analysis, and how these can be both used together and compared.

Session objectives
• To share with community researchers the basic elements of social science research using a co-enquiry approach (see Chapters II and III for related literature);
• To determine specific questions related to livelihoods and wellbeing, and the impact of community conservation/PES in their community.

Facilitators
This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with expertise in social science research processes.

Adaptations
It is natural that within community research teams some members are more interested and active than others. This does not have to be a weakness, but can be taken advantage of. For instance, the more active individuals will naturally become ‘de facto’ leaders of the team. These team leaders are encouraged to take responsibility for a number of different elements of the research and for the integration of the more passive members of the team. It is important that the leaders identified have a strong desire to help their community and to participate actively in the research process, as they will inevitably invest more energy and time in it.

In the Chinantla, the de facto team leaders were the bilingual, literate individuals. They were happy to take the responsibility for note-taking, data systematisation and for engaging in the time-consuming process of translation and interpretation throughout the training process.

Should there be pre-existing conflicts within the group (which there often are), it is important to allow these to be aired and discussed prior to beginning work with a view to achieving an agreement to work together to carry out the research the community needs.
Participants
- Local research team and any other community member interested in livelihoods/wellbeing issues within the community
- Special attention must be given to integrate different social groups of the community into the workshop, such as women, young people and elders, as they can provide different views of the needs and local realities.

Expected results
At the end of the session, the participants will:

(i) Be acquainted with the action-research cycle and its steps;
(ii) Understand how a social science research process fits in with the action research cycle; Recognise general social science research processes they implement in their daily lives to answer questions;
(iii) Understand the meaning of qualitative versus quantitative methods and data, and how each is used.
(iv) Define specific research questions to be answered through a co-enquiry process.

General thematic content
a) Finding a common language for research
b) The action-research cycle (see Chapters II and III for related literature)
c) Social science research and the importance of the researcher's attitude
d) Quantitative versus qualitative methods and data
e) Selection of research themes and questions
f) Description and discussion of proposed methods

Learning experiences
- Theoretical presentation and dialogue for a) – d)
- Dialogue and reflection for d) and e)
- Presentation and discussion for f)

Session development
It is suggested the training session be organised as follows:

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.
II. Theoretical revision
In this section, three key concepts will be addressed:

- A common language for the research process
- The action research cycle and social science research (qualitative versus quantitative research)
- The basics of social science research

A common language for the research process
Language is an important tool to reach a common understanding of a research process. Often external academics are used to freely deploying scientific and technical language without taking into account that most local people may not understand it. This section is not aimed at teaching or transferring the scientific and technical words to the community researchers, but rather at reaching a common understanding, between facilitators and community researchers, of how to name particular processes, objects, tools, approaches, etc. For the purposes of this protocol, the research team proposed to determine a common language for the overarching domains of social science research, conservation and livelihoods. For each one of these, the facilitator promotes an exchange of ideas: dialogue is encouraged to analyse the differences between the external and the local definitions. The team’s work to define mutually understood concepts will continue throughout the workshop, as and when needed.

The proposed terms for discussion are:

- Co-enquiry
- Social science research
- Conservation
- PES
- Livelihoods
- Wellbeing

The facilitator must be aware that some words may have a stronger political load and therefore may need more time to be defined. As a first result of this exercise, the team should adapt the language used during the rest of the plan research process to the one that was commonly defined.

The action research cycle

Adaptations
Throughout the workshop, a useful technique for ensuring that all participants have understood the concepts, themes and questions under discussion is to ask one of them to explain it to the others in the local language. This technique very rapidly reveals whether the participants have understood the concepts or not, even if the facilitator does not understand the local language.

In the Chinantla experience, half of the participants in the workshop were monolingual for Chinantec, which was a significant challenge for the facilitators. The solution found was that the other bilingual participants interpreted and translated the dialogue throughout the workshop. While this naturally lengthened the time required for certain elements of the workshop, it also allowed the monolingual participants to feel more comfortable and to participate in the discussions. However, it was essential that the bilingual participants who supported this process were also literate (able to read and write) as social science research depends on writing – even when carried out in a co-enquiry process.
Assuming that most of the local participants have no previous experience with social science methods and/or the action-research cycle, in this section a presentation and explanation of both concepts is provided. A simple schema for the action research cycle using co-enquiry is provided in Figure 24.

![Diagram of the action research cycle]

**Figure 34: Schema for the action research cycle**

In order to explain this cycle it is useful to have local examples. In the case of the Chinantla the problem of rats in the corn fields was used as a local problem. Using the above action research cycle, community researchers developed a series of questions regarding the issue, and explored processes for answering those questions. The action research cycle with the example is provided in Figure 25.
Figure 35: Action research cycle with concrete example

This first round of questioning led to the conclusion that if there were 60 rats found over the 3 weeks of monitoring, it would be too much and the decision to trap them would be made. Sometimes, rather than a direct solution, another question appears based on the findings for the previous question: for this reason it is an action research cycle. Facilitators are encouraged to think creatively about what kinds of local problems may help community researchers think through the research cycle.

The basics of social science research
Having discussed what social science research means and the concept of action research, here the facilitator explains some of the important elements of social science research, including:

- Qualitative versus quantitative research

This section to be done with examples, and using a comparison table such as Table 14 if required.

Table 14: Comparison between qualitative and quantitative research approaches (see also Newing 2010)

<table>
<thead>
<tr>
<th></th>
<th>Qualitative research</th>
<th>Quantitative research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data</strong></td>
<td>Non-numerical data (commonly words or pictures)</td>
<td>Data as numbers (data easily convertible into numbers)</td>
</tr>
<tr>
<td><strong>Data collection</strong></td>
<td>Semi-structured interviews Focus groups Ethnography</td>
<td>Surveys Questionnaires</td>
</tr>
<tr>
<td><strong>Data analysis</strong></td>
<td>Descriptive, exploratory, in depth. Critical analysis and construction of a</td>
<td>Statistical (explains phenomena using</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Easy example</th>
<th>Narrative account</th>
<th>Numbers/measures, data can be measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>The people in the group are… (e.g. friendly, from different parts of the world, hard-working, etc.)</td>
<td>The people in the group are… (e.g. X number of people, X men and X women, X parents, X finished high school, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Can clearly present some forms of data that are useful for decision-making, or for following up. E.g. X% of people grow enough corn to feed themselves in a community.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes the situation as people see it, full, in-depth understanding of nuances, differences, heterogeneity, underlying relationships. Gives us understanding of people's personal experiences and reactions Qualitative research will allow us to understand what narratives (stories) people have about their life.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Not flexible Misuse of the process can result in lack of validity and accuracy. The need for closed, categorical answers does not allow for nuances and limits understanding of connections between phenomena and broader phenomena. Knowledge produced is often abstract and not easy to apply.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult to generalise beyond the given setting of the research. Data collection and analysis is time-consuming Results can be influenced by the researcher Sometimes not well-accepted by 'authorities' as not 'hard data'</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How is it going to help us with our research?</th>
<th>It can help determine information surrounding very specific quantifiable issues.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It can help gain an in-depth understanding of people's perceptions of their current situation, impacts and opportunities they are facing, how they respond, etc.</td>
<td></td>
</tr>
</tbody>
</table>

**Adaptations**

If participants are unlikely to understand this section on qualitative versus quantitative research, it can be left out. It can also be significantly simplified by using the examples to distinguish between research that seeks to “describe/tell how things are and how people think” and research that seeks to “measure things”.

The examples used must be relevant to the participants (i.e. be drawn from their everyday experiences). It is therefore important that the facilitators are well-prepared prior to the workshop as they must be informed of topics of interest of the community and how these can be used to exemplify the theoretical training.

- Flexibility, participation, and researcher attitude
The facilitator explains the importance of flexibility and of an open and mindful attitude on the part of the researchers for the success of their research. Amongst others, the facilitator underlines that the community members who are the subject of the research methods have a voice in how the method is carried out, what the questions are and how the results are written up. The community researchers are trained to take note of, and act on, the requests and suggestions of other community members. They are taught to build flexibility into their methodological approach, and of the value of being an excellent listener. They are taught not to bias results by giving their own opinions and/or answers during interviews and focus groups.

- **Triangulation**

The facilitator explains that given that everyone will have a different opinion and give it in their own specific way, it is important to *triangulate* information, by asking the same things to different people. This will ensure the elaboration of a more complete picture of the topic under investigation.

- **Participant observation**

Participant observation is the central method for social science research, and, in conventional research (particularly anthropological and sociological) it is a core component of the process by which researchers and communities get to know each other (see Barnard 2005 for an overview of the method). The principal tenet of participant observation is that outsiders participate in everyday life while observing social and cultural practices. The process informs a deep, and often embodied, understanding of cultural norms and social processes, which helps tonify relationships and lubricate the research. Participant observation requires researchers to spend some time simply working, talking, eating, drinking, sleeping, celebrating and, generally, sharing in everyday life with the community and its members, all the while taking mental note of how people (including the researcher him/herself) are acting, what they say to each other, how they engage with each other and outsiders (including the researchers), what makes them happy, angry, sad, fearful, how they move through their landscape, how and why they make choices, and so on. When key events or insights emerge, the researcher takes note of them and of any attendant learning experiences.

In the context of co-enquiry, the concept of participant observation has to be modified slightly, given that the researchers belong to the community in question. This belonging gives community researchers a significant advantage: they automatically participate in everyday life without having to make any additional efforts to do so. However, they will have to make the extra step of observing the social life of their community through new eyes. This method can be introduced to community research process very simply: the researchers can draw on specific aspects of their daily life, knowledge and experiences to inform the overall research process they are undertaking. They can observe themselves and their fellow community members as they go about their daily lives in light of the research questions that they have developed, taking mental, written or audio-recorded notes of connections and insights. These notes can then be discussed in dialogues with
the other community researchers during co-enquiry sessions, and can thus feed the more structured research processes.

III. Defining research themes and questions
In this case, the overarching research theme – livelihood impacts and benefits from community conservation/PES – as well as the overarching research questions mentioned above were defined previously by the communities. Given that the decision to carry out social science research will have emerged from previous discussions with community members about what research themes they are interested in, it is expected that the research team will have an incipient idea of what these themes are, yet definite themes and research questions may need to be developed, and a process for doing so is now described. It is fruitful at this point to cover, once again, the concept of research questions that was explained above during the discussion of the action research cycle.

Definition of the research questions can be carried out according to the following path:

<table>
<thead>
<tr>
<th></th>
<th>Division into 2 groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Group 1 is asked to brainstorm and write down, on a flipchart, the issues that arise for their community surrounding the terms ‘community conservation’ and ‘PES’, and how they understand them to be connected. Group 2 does the same for ‘livelihoods’ and ‘wellbeing’ (as defined in period B of the workshop), and how they understand them to be connected.</td>
</tr>
<tr>
<td>3</td>
<td>Back with the whole group, the facilitator promotes a discussion about the issues emerging from the 4 mind maps. Other participants complement mind maps they did not participate in. The group then finds connections between issues emerging in each mind map. The final flipchart page may look like a cross-crossed network of lines.</td>
</tr>
<tr>
<td>4</td>
<td>The connections made between these issues are then systematised and grouped thematically, and each thematic group will be the basis of the research themes, which then undergo further refinement through group discussion.</td>
</tr>
<tr>
<td>5</td>
<td>Based on the research themes defined (probably a total of 3), research questions are developed. Research questions can overlap more than 1 research theme, and there can be more than 1 research question per theme.</td>
</tr>
</tbody>
</table>
IV. Connecting research questions to methods

Based on the research questions defined, the group discusses what kind of data is required to answer the question, the feasibility of the research question, whether the research question can be answered by the CRs alone (or whether they need specialists), etc. The results of this discussion can be easily visualised using a table such as Table 15. Based on this discussion, the facilitator will guide the group discussion on the available methods for producing the data required. Here the facilitator’s expertise on the ‘pros and cons’ of different methods for achieving different types of data will be essential.

Table 15: Linking the research questions to proposed methods

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Information required (what kind?)</th>
<th>Methods proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many rats are there in the corn fields?</td>
<td>Numerical</td>
<td>Counting rats through night-time monitoring</td>
</tr>
<tr>
<td>How did we live 20 years ago?</td>
<td>Descriptive, detailed, stories</td>
<td>Semi-structured interviews Oral histories</td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At this stage, rather than explain in depth what each research method is and does, the facilitator simply gives a broad outline of the approaches and the kinds of results they yield, noting that the subsequent days of the workshop will be dedicated to explaining and learning about these methods.
This is a useful moment at which to conclude, with the facilitator taking the opportunity to recapitulate on the day’s work and to ensure that most participants have understood the concepts and outcomes of the workshop.

**Adaptations**
As mentioned above, in the Chinantla we found that a very useful way of recapitulating on learning outcomes (throughout the workshop as well as at its conclusion), was to ask the participants to explain the concepts and outcomes to each other in their language (Chinanteco). Should doubts arise, the facilitator will take the time to explain again, in using different/easier terms and/or other examples.

**Example of a work plan**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 1 hours, AM</td>
</tr>
<tr>
<td>III. Defining research themes and questions</td>
<td>Day 1. 1 hour, AM.</td>
</tr>
<tr>
<td></td>
<td>- Small group brainstorms</td>
</tr>
<tr>
<td></td>
<td>Day 1. ½ hour, AM.</td>
</tr>
<tr>
<td></td>
<td>- Making connections</td>
</tr>
<tr>
<td></td>
<td>Day 1. 1 hour, PM.</td>
</tr>
<tr>
<td></td>
<td>- Thematic grouping of connections,</td>
</tr>
<tr>
<td></td>
<td>emergence of research themes</td>
</tr>
<tr>
<td></td>
<td>Day 1. 1 hour, PM.</td>
</tr>
<tr>
<td></td>
<td>- Research questions based on themes</td>
</tr>
<tr>
<td>IV. Connecting research questions to methods</td>
<td>Day 1. 1 hour, PM</td>
</tr>
</tbody>
</table>

**Equipment and materials**
- Notebooks, pencils and pens
- Flip chart paper and marker pens
- Educational material to illustrate the action-research cyc
### Semi-structured interviews and oral histories

**Addresses**

**Objective A.** Document local perceptions of community livelihoods and wellbeing prior to community conservation and Payments for Environmental Services.

**Objective B.** Document the most important changes in community life and the drivers of these changes.

**Objective C.** Document current livelihoods and wellbeing status among community members and changes in this status over time.

**Objective D.** Document community members’ approaches to deal with impacts and utilize opportunities arising out of the changes their community is facing.

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### Semi-structured interviews

Semi-structured interviews are different from other forms of interview such as structured interviews or unstructured, conversation-style interviews. A structured interview has a set amount of questions that the interviewer must ask, without deviation; this type of interview can be likened to a spoken questionnaire. Conversely, when carrying out semi-structured interviews, while the interviewer has a set of a few broad topics s/he would like to discuss throughout the interview, s/he will be mindful to allow the interviewee to discuss issues that are clearly interesting and/or important to them, even if these issues do not fall into the originally established topics for discussion. Often the topics that are of particular interest to interviewees are to be taken as sources of important data. Semi-structured interviews differ from fully unstructured interviews in that the latter do not follow any particular theme, allowing the person interviewed to talk about whatever they desire. Such interviews can also be likened to loosely structured conversations. See Newing (2010) and Barnard (2005) for further information on the different modes of interview.

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### Voices from the communities: interviewing elders

Pataxó community researchers from the COMBIOSERVE fieldsite of Southern Bahia noted that one of the great challenges for their co-enquiry research, particularly among the young community researchers, was the lack of trust of elders. With a long history of deception by anthropologists and of knowledge being given and nothing returned to the community, elders were sometimes reticent to talk to young community researchers, and in particular to discuss their traditional knowledge. This situation is not uncommon among communities who have been over ‘researched’ in the past. Slow, patient work is needed by young community researchers to overcome this entrenched mistrust; once trust is built, concerted efforts must be made to maintain it. Some communities may also address mistrust amongst elders by electing an elder, or at least an older person or someone with authority in the community, to be part of the research team.

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### Session objectives

The purpose of this workshop is to train community researchers in the semi-structured interview method, and in the design of an easy-to-use semi-structured interview for use by community researchers.
Facilitators
This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with expertise in conducting semi-structured interviews (for more methodological information on semi-structured interviews see Barnard 2008, Newing 2010).

Participants
- Local research team and any other community member interested in understanding livelihoods/wellbeing issues within their community.
- Special attention must be given to integrate different social groups of the community into the workshop, such as women, young people and elders, as they can provide different views of the needs and local realities.

Expected results
At the end of the session, the participants will know how to carry out a semi-structured interview and understand the purpose of semi-structured interviews, what ‘semi-structured’ means, and the do’s and don’ts of the method.

General thematic content
a) What are semi-structured interviews (vs structured interviews and informal chats)?
b) The rules of semi-structured interviewing
c) Note-taking
d) Developing interview questions

Learning experiences
- Theoretical presentation for a) – c)
- Practical exercises for a) – c)
- Dialogue and group reflection for d)

Session development
It is suggested the training session be organised as follows:

Figure 36: Framework for training community researchers in semi-structured interview methods

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.
II. Theoretical revision and short exercises

The facilitator explains what a semi-structured interview is, using examples from the daily lives of the community. This is a dialogue session in which the facilitator asks the participants to talk about instances in their own lives in which they use the question and answer method. It is useful to ask participants to translate the concept into their own language in order to ensure a basic understanding.

The facilitator then presents some of the rules surrounding semi-structured interviewing.

- *Types of question*

**Open questions**: questions that allow the interviewee to elaborate and to give details that the interviewer might not have thought of. They also prompt you to ask further follow-up questions. Most questions in the interview should be of this kind.

- E.g. “Tell me about the last time you went to town.” Posing a question this way will allow the interviewee to elaborate on when they went, why they went, what happened, etc. It also leaves room for obvious follow-up questions.

**Follow-up questions**: questions that seek to explore a topic further, based on the answers given to the first, open question.

- E.g. “What happened then?”, “Tell me more about X”, “Why did you make that decision?”, “What did you think of X?” and so on.

**Closed questions**: questions that have only one answer, and are useful only if very specific information is required.

- E.g. “When did you last go to town?” This only yields one piece of information, and if used unwisely can result in a topic of conversation ending.

**Emergent questions**: questions that follow up on themes of interest, even if they aren’t necessarily answering the original question.

- E.g. If to the question “Tell me about the last time you went to town” the interviewee’s answer includes a topic that is not directly related to their time in town, but is interesting to the interviewer (e.g. they start talking about their time in school), an emergent question is a question that follows up on the non-connected topic (e.g. “Tell me more about your time in school.”)

**Adaptations**

It may be that using terms such as 'open questions' or 'emergent questions' is too theoretical for some community research teams. If so, the facilitator simply gives examples of questions that work better than others, and promotes a group discussion about their differences. This process may take longer than the more direct transfer of theoretical information, but the group's understanding of the importance of formulating good questions is likely to be deeper.
**Leading questions**: these are questions in which the interviewer ‘forces’ the interviewee to answer in a certain way, usually with either a yes or no answer. These questions are to be avoided as they may lead to bias.

- E.g. “Was your last time in town very difficult?”

- **Order of questions and interjections**

The facilitator explains the importance of ordering interview questions, and best practice approaches to do so.

- *Launching a theme*: Open questions
- *Following up on sub-themes*: Follow-up questions
- *Following up on new themes*: Emergent questions
- *Conclusion of the interview or to obtain specific information*: Closed questions
- *Interjections*: In order to encourage the interviewee to continue speaking or to elaborate on certain points, interjections are important. Examples are: “mmhmmm”, “I see”, “yes”, “and then?”, and so on. Nodding and smiling are also useful encouragements.

**Exercise**: with the example used previously to describe the types of questions, the facilitator carries out two interviews with participants: the first with the questions placed in an incorrect order and without interjections, and the second with the questions placed in the correct order and with appropriate interjections.

- **Being flexible, mindful and a good listener.**

The facilitator explains the importance of being flexible, mindful and a good listener.

For example, he or she may emphasise the importance of not ‘forcing’ someone to respond to a question if they do not appear to wish to. This is especially important for community researchers, as they are members of the community and therefore it is important that people feel they can withhold information if they wish to.

**Exercise**: the facilitator asks participants what topics might be awkward for them to ask their community’s members about, in the context of interviews about livelihoods, wellbeing, conservation and PSA. A brief discussion is held on how community researchers may tackle this awkwardness.

The facilitator may also discuss, amongst others, the importance of allowing people to talk even if they appear to be heading off theme, of not interrupting, and of listening very closely to interviewees’ answers in order to ask pertinent follow-up and emergent questions.

**Adaptations**
If there are only one or two community researchers who can write (as was the case in the Chinantla experience), this element of the workshop can be carried out exclusively with these participants at a later point in the day in order to avoid losing the interest of non-literate participants.
• Taking notes and using recording devices

The facilitator explains the value of note-taking, the importance of consistency, full notes, and memorable quotes; he or she emphasises that short or truncated notes without context will be useless, even to the researcher themselves. Notebooks must be kept in order with date and time, place, names, and page numbers. The facilitator shows an example of a well-maintained interview notebook.

The facilitator explains the use of a recording device, yet discusses the pitfalls of using recording devices: some people don't want to be on record, or feel awkward if a recording device is put in front of them; some people may not answer fully or with ease when there is a recording device; and transcriptions are very time- and energy-consuming and require a computer and good typing skills. In addition, even if recording devices are used, interviewers must take notes, as audio recordings are often unreliable, difficult to use, and can be lost due to electronic/mechanical failure. These are all valid reasons for choosing not to use audio recording during interviews.

The golden rule therefore is: write it down, write it down, write it down.

Exercise: The facilitator interviews a participant for a few minutes: the group is asked to take notes and subsequently compare them. This will engage the group in a reflection on the importance of keeping excellent notes.

If the interview takes place in the local language, which are often more oral than written, it is likely the notes will be taken in the lingua franca (in the Chinantla case, Spanish). It is important that the notes taken contain full information.

Exercise: One participant interviews another participant in the local language for a few minutes, the group is asked to take notes in Spanish and subsequently compare them.

• Dos and don'ts of semi-structured interviews: recapitulation and exercises

This section of the workshop can be used as a recapitulation of the previous theoretical points. Using a flipchart, the facilitator asks participants to remind each other (based on the previous hour's work) of the do's and don'ts of semi-structured interviews. It is expected that the list will include:

- Leading questions
- Closed questions
- Being impatient
- Interrupting
- Giving your own opinion
- Suggesting answers

Exercise: In order to give context to these do’s and don’ts, the facilitator interviews
someone in the group, and asks the group to stop and correct them at any time they do a "don't". After that, they group is asked to appraise the interview for all of the do’s and don'ts and for their overall impression of the interview.

III. Defining the interview questions
The facilitator reminds the group of the research questions that were elaborated during the Grounding workshop. The group then brainstorms, through a dialogue process led by the facilitator and aided by a visual such as provided in Table 18, a series of ~3 interview questions that may help answer the main research questions. The interview questions can easily be tested during this session in order to refine them and ensure they are understandable.

**Adaptations**
If the group is too big, it subdivides into smaller groups, each to work on a specific research question. These smaller groups brainstorm a series of about 5 more specific research questions that will help answer the main research question. Back in the main workshop session, the group shares their questions; these are then discussed, ordered and set out as a protocol for use by the group. It is also suggested that the questions be translated into the local language as they are being discussed in order to ensure full understanding and appropriate formulation. This is especially true if there are monolingual members in the community research team.

In the Chinantla case, the community research team worked together to develop ‘formal’ interview questions in the Chinantec language. This helped to include the more passive members of the group into the discussion and allowed the whole team to formulate the most appropriate questions – questions that would be understood by as many different members of the community as possible. This process was catalytic in bringing together the newer generations (bilingual, literate) with the older ones (monolingual, non-literate), and in helping them establish a common language for work.

<table>
<thead>
<tr>
<th>Table 16: Connecting interview questions to research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research question</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

IV. Practical exercises
Using the interview questions, two volunteers (which can include the facilitator if necessary) come forward to interview each other sequentially. The rest of the group analyse their technique and highlight potential issues with question formulation. The facilitator leads a short discussion on the exercise.

Following this example, the participants are sent out to the community to carry out one or two interviews (depending on the time and interviewees available). A final plenary session is convened to discuss issues that have arisen, to deal with challenges and to refine the interview protocol if deemed necessary by the participants.
V. Task assignment
This session is used to discuss the schedule and implementation of the interviews during the subsequent fieldwork. It is also used to emphasise the importance of good note-taking, as it will be expected that the community research team have clean and usable notes by the time the Results analysis workshop takes place.

Adaptations
In the Chinantla experience, given that only one person was able to take notes, the community research team carried out practice interviews together. This had advantages as all participants had experienced the practice interviews together, leading to a rich discussion of the method. However it also had its drawbacks as some monolingual members of the group, who were apparently less interested in the research process, occasionally interrupted the interview. Solutions to such problems can be sought within the community research team. However, if the problem is not manageable at the level of the community research team, it must be worked out through community-wide decision-making processes in order to avoid the possibility of intra-team conflicts.

In the present case, they decided to continue with group-led interviews, but that the interviewer would be different for each interview, meaning that everyone had the opportunity to be the only one speaking and attention was focused on the interview. Moreover, it can be useful for the facilitator to support the team leaders by carrying out team dialogues through ‘cultural circles’ (see Chapter III, through which the team focus on how the themes of the interviews are related to their daily lives, to ignite their interest in pursuing the process. This process can be supported with audiovisual props such as photos, videos, etc.

The Chinantla community research team also reported that one of the more significant problems they encountered was that some of the people they interviewed had little interest in/knowledge of the themes of the interview. They found that carrying out such interviews was tiring both for the community research team and the interviewee. They therefore drew up a list of individuals within the community whom they knew would be interested both in the theme and in spending time discussing the topics.

In order to have an effective and relevant group dialogue, it is important to understand local terminology in order to ask the ‘right’ questions (that people can connect with) when launching the dialogue. For example, in the Chinantla, it was not relevant to ask questions such as “How did the interviews go?” as the concept of “interviews” was not immediately easy for all participants to grasp. Rather the facilitators asked “Was the work difficult?” given that they use the term ‘work’ for all forms of occupation. In these cases, leading questions can be very useful in generating dialogue as they are clearer and more direct than open questions; in this sense, they should not be avoided (conversely to the ‘rules’ of most social science research).

Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 1-2 hours, AM (this includes short exercises)</td>
</tr>
<tr>
<td>III. Defining interview questions</td>
<td>Day 1. 1 hour, AM</td>
</tr>
<tr>
<td>IV. Practical exercises</td>
<td>Day 1. ½ hour, PM.</td>
</tr>
</tbody>
</table>
> Two volunteers’ interview each other with an audience, wider group analysis

Day 1. 1 hour, AM.
> Participants interview community members.

Day 1. 1 hour, PM.
> Final group discussion, finalisation of the interview protocol, etc.

| V. Task assignment | Day 1. ½ hour, PM. |

**Equipment and materials**
- Notebooks
- Pencils or pens
- Flip chart paper
- Marker pens
- Projector

**Oral histories**
Oral histories are often used to obtain information on important changes that societies have undergone – especially in recent history. Oral histories are not intended to generate an objective picture of history, but rather one that is drawn by personal accounts. Through oral history, researchers can understand the events that have marked the community, which ones people think are most important or significant, why they occurred, and their consequences for individuals and the collective. Although the methodological approach is similar to that of the semi-structured interview, they are used more specifically to obtain systematic and in-depth historical information.

The structure of the oral history workshop follows very closely that of the semi-structured interview: if oral history is the only method required, the following workshop protocol can be used. However, if it is required as part of a larger bundle of methods, including semi-structured interviews, it is suggested that the facilitator include oral histories in the semi-structured interview workshop.

**Session objectives**
To train community researchers in the use of the oral history method for gaining an understanding of community histories and changes over time.

**Facilitators**
This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with expertise in conducting oral histories.

**Participants**
- Local research team and any other community member interested in understanding livelihoods/wellbeing issues within their community.
• Special attention must be given to integrate different social groups of the community into the workshop, such as women, young people and especially elders, as they can provide different views of the needs and local realities.

Expected results
At the end of the session, the participants will (i) understand the importance of oral histories; (ii) understand how oral histories can be used to answer research questions; and (iii) know how to implement a good oral history interview.

General thematic content
   a) The purpose and use of oral histories
   b) The rules of oral history interviewing (see Semi-structured interviews)
   c) Carrying out oral histories

Learning experiences
• Theoretical presentation for a) and b)
• Practical exercises for c)
• Dialogue and group reflection for a) - c)

Session development
It is suggested the training session be organised as follows:

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
The facilitator explains the oral history method: it is similar to the semi-structured interview method, although it may be even less structured and can take much longer (up to a few days in some cases). In order to explain the method, the facilitator uses examples from the daily life of community members.

**Exercise:** the group discusses what they would do if they wanted to know what changes the community had undergone in the past 40 years. The discussion is most likely to lead to oral histories as a solution.

The facilitator is invited to use the format of the theoretical session described above, including all of the do’s and don’ts (which are highly relevant in this context as well) and to adapt the short exercises to an oral history format.
The important element to highlight with oral histories is that there may be even fewer interjections or questions by the interviewer than in semi-structured interviews. The facilitator also provides some basic rules for the interviewer:

- To ask follow-up questions, if the interviewee stops their narrative or seems unsure about what to talk about next;
- To probe, if one particular element of the narrative requires more detail;
- To re-direct the oral history if the interviewee veers significantly off track;
- To allow the interviewee to tell their story unimpeded, no matter how long it takes; and
- To take excellent notes throughout the interview, no matter how long it takes.

III. Practical exercises
The facilitator demonstrates the beginning of an oral history interview with one of the participants, and asks the participants to intervene when (purposeful) errors are made. Participants then pair off and carry out hour long oral history interviews with each other. The facilitator circulates in order to help with queries or issues that arise.

IV. Group discussion
The facilitator leads a group discussion based on the practical exercise. Problems and challenges are aired and explored, and the group collectively seeks solutions. The group also discusses the relevance of the oral history method for answering the project research questions and decides who in the community may be an ideal subject for this type of research.

**Example of a work plan**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 2 hours, AM (this includes short exercises)</td>
</tr>
<tr>
<td>III. Practical exercises</td>
<td>Day 1. ½ hour, AM</td>
</tr>
<tr>
<td></td>
<td>&gt; Facilitator-led demonstration</td>
</tr>
<tr>
<td></td>
<td>Day 1, 2 hrs, AM and PM</td>
</tr>
<tr>
<td></td>
<td>&gt; In pairs, participants take turns to carry out oral history interviews with each other.</td>
</tr>
<tr>
<td>IV. Group discussion</td>
<td>Day 1. 1 hour, PM.</td>
</tr>
<tr>
<td></td>
<td>&gt; Group discussion,</td>
</tr>
</tbody>
</table>

**Equipment and materials**
- Notebooks
- Pencils or pens
- Flip chart paper
- Marker pens
Focus groups and leading community workshops

Addresses

Objective B. To document the most important changes in community life and the drivers of these changes.

Objective E. To support community efforts as members reflect on the connection between research results and community decision-making processes.

Focus Group

Focus groups are a form of qualitative research used to obtain information regarding perceptions, opinions, beliefs, and attitudes towards a particular issue, that emerge when interviewees communicate with each other. Questions are asked in an interactive group setting where participants are free to talk with other group members. Focus groups are more than mere group interviews: the interactions between participants are also important sources of data. Focus groups therefore require participants to talk to each other – by asking questions, exchanging anecdotes and commenting on each other’s experiences and points-of-view – rather than exclusively to the interviewer/facilitator. The method is particularly useful for exploring people’s knowledge and experiences and can be used to examine not only what people think but how they think, why they think that way, and their way of relating to other people’s experiences.

Session objectives

Community researchers are able to carry out focus groups for the purposes of co-enquiry research.

Facilitators

The focus group should be led by an external or local team member with abilities to lead a group discussion and who has expertise in leading focus groups.

Participants

Local research team and any other community members interested in the method.

Expected results

At the end of the session, the participants will know how to implement a focus group and understand the pros, cons and specific uses of the focus group method.

General thematic content

a) Focus groups as a social science research method
b) How to organise and implement a focus group

Learning experiences

- Theoretical presentation for themes a)
- Practical exercises and group dialogue for b)

Session development

It is suggested the training session be organised as follows:
I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
The facilitator provides the theoretical background on focus groups. Situations in the daily life are used as examples to illustrate this theoretical background.

**Exercise:** what is a ‘natural’ focus group in the daily life of a community member? E.g. when a family makes a decision about what to plant and when, or when to collect firewood; when neighbours discuss how to resolve a problem; etc.

The facilitator describes the practical steps required to implement a focus group, taking note of them on a board or a flipchart page:

(i) Decide on focus group objectives, interview questions and discussion points;
(ii) Invite participants to participate and schedule a convenient time for the focus group to take place;
(iii) Prior to starting explain the purpose of the focus group;
(iv) Implement the focus group (see protocol for semi-structured interviews for details):
   a. Launch the discussion asking an open question
   b. Ask follow-up and emergent questions throughout the discussion
   c. Take good notes of the answers and the interaction between participants

The benefits and disadvantages of focus groups are then discussed. Facilitators are encouraged to add to the lists provided in Table 19 based on their own experiences.

**Table 17: Benefits and disadvantages of focus groups**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect data on group interactions and dynamics between different people within the group</td>
<td>Power dynamics within the group can result in biased results. Some people naturally are more at ease with speaking in a group than others (not necessarily the result of power dynamics), in which case careful moderation can help to ensure that all focus group participants are</td>
</tr>
</tbody>
</table>
Simple and easy method | Data may be difficult to analyse
---|---
Data can be richer than that emerging from interviews if/when people encourage each other to explore the issues through dialogue | People may not want to talk to each other about sensitive issues.

**Exercise:** the facilitator promotes a discussion among participants about what they think may happen during a focus group in their community: what may be people’s reactions to answering questions in a group (shyness? Will some people speak more than others?). Participants discuss what they may do, under the circumstances, to ensure the smooth flow of a focus group.

### III. Practical exercise
The facilitator reminds the group of the process for implementing a focus group. Participants decide which themes they wish to explore using the method. The group elects a facilitator and a note-taker. The focus group facilitator briefly discusses his/her strategies and questions for the focus group with the workshop facilitator prior to beginning. Once the focus group has started, the workshop facilitator observes and provides support and advice if necessary, checking specifically on the work of the note-taker. Once the session is over (probably after about 30-45 minutes), participants exchange experiences, opinions and ideas regarding the method.

At the end of the exercise, the workshop facilitator leads the process of systematising the notes taken by the note-taker during the exercise, using the approaches described in Methods group 0.

### IV. Group discussion
The facilitator mediates a discussion between the participants about the merits of the method and how it can be used to answer the project's research questions. The facilitator also promotes a discussion on the notes taken, launching a group reflection on how these notes can be analysed for useful conclusions to be drawn.

The group decides what research questions may benefit from the focus group method, and brainstorm some open questions and discussion points that may be used to initiate dialogue during the focus group.

### V. Task assignment
Focus groups are planned for answering specific research questions. Participants suggest a schedule for implementing the method and a list of possible willing participants from the community to invite.

*Example of a work plan*

<table>
<thead>
<tr>
<th>I. Introduction</th>
<th>Day 1. 15 mins, AM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 1 hr, AM.</td>
</tr>
</tbody>
</table>
Workshops

Session objectives
The objective of this session is to train community researchers to lead a community workshop.

Facilitators
The session should be led by a external or local team member with abilities to lead a group discussion and who has expertise in leading community workshops.

Participants
All community researchers and any community member interested in learning the skills required to lead a workshop will be invited.

Expected Results
At the end of the session, the participants will have the skills necessary for leading a community workshop on any topic.

General thematic content
a) The purpose and use of workshops
b) The overall structure and proceeding of a workshop
c) Workshop design
d) Workshop leadership/facilitation
e) Workshop evaluation

Learning experiences
• Theoretical revision for a) – e)
• Practical exercise for c) – e)

Session development
It is suggested the training session be organised as follows:
I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
The facilitator presents some of the basic theoretical background on workshops, explaining specifically what they are and how they are used. Given that most participants will have participated in at least one workshop in their life, this is a good occasion for them to express their own understandings and opinions about workshops. of what a workshop is, the frustrations they may feel during workshops, their opinion of what works and what does not, experiences they had of good and poor workshops, etc.

**Exercise:** Group discussion, using questions such as: what is a workshop in your experience? What are workshops useful for? What are the limitations of the workshops you have participated in? What are good practices in workshops? What are bad practices in workshops? The facilitator is encouraged to think of other useful questions to add to this list.

A volunteer note-taker takes down the following information on a flipchart page as the information may be useful for future exercises:

- Elements of a workshop
- Uses of workshops (the different aims of workshops)
- Limitations of workshops
- Good practices in workshops
- Bad practices in workshops
- etc.

Based on the previous discussion, the facilitator promotes a discussion on workshop structure. Depending on the aim of the workshop, it is likely to contain one or more of the elements described in Table 20.

**Table 18: Workshop elements**

<table>
<thead>
<tr>
<th>Introductions</th>
<th>The facilitator introduces the workshop, and if people don’t know each other, participants introduce each other.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop theme</td>
<td>Brief presentation, and group discussion to gauge participant’s</td>
</tr>
</tbody>
</table>
III. Practical exercise

Based on the previous discussion, the facilitator leads a process whereby the participants themselves organise a ‘practice’ workshop aimed to last between 1 and 2 hours (including a 10 minute evaluation at the end). The practice session will be led by an elected small group of facilitators and recorded by an elected note-taker. The other members of the group will be ‘workshop participants’.

The group brainstorms about what kinds of questions they need to answer to plan a good workshop. The discussion is likely to yield, amongst others, the following elements:

- What is the aim of our workshop?
- What do we hope to achieve by the end of our workshop?
- What are the elements we need for our workshop?
- How should the workshop be structured?
- What time will we allocate for each section of the workshop?
- How will we encourage people to participate?
- How can we encourage people to carry out practical exercises? What practical exercises should we include?
- What breakout sessions should we include? What should the tasks of each small group be? How can we make sure they complete their tasks in the allocated time?
- Is our plan likely to yield our expected results?

The ‘facilitators’ choose a workshop theme for their practice workshop (ideally small, self-contained elements of their next important ‘real’ workshop to be organised within the community). They then plan their workshop using the above questions (and others that have arisen) as guides for the process. During this time the ‘participants’ take a break.
Once the planning is complete, the workshop is carried out; the facilitator remains available for questions or issues that may arise during the practice. 10 minutes are allowed at the end of the practice workshop for briefly evaluating the structure and facilitation of the workshop.

IV. Group discussion
The facilitator encourages a group discussion about the method, to allow any uncertainties, queries or issues to be aired.

V. Task assignment
With the support of the facilitator the group plan a community workshop on the topic of the project, to be held shortly thereafter.

<table>
<thead>
<tr>
<th>Example of a work plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>III. Practical exercise</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>IV. Group discussion</td>
</tr>
<tr>
<td>V. Task assignment</td>
</tr>
</tbody>
</table>

Equipment and materials
- Notebooks
- Pencils or pens
- Flip chart paper
- Marker pens
Data systematization and results analysis workshop

The Results analysis workshop trains community research teams learn how to systematise their data, analyse it and draw conclusions for validation by the wider community.

Session objectives
This session aims to establish a co-enquiry framework for data systematisation and results analysis.

Facilitators
This workshop should be facilitated by an external or local team member with abilities to lead a group discussion and with expertise in social science research processes.

Participants
Local research team and any other community member that are participating in social science research within their communities.

Expected results
At the end of the session, the participants will know how to systematise their qualitative data, understand the steps to analyse their data and know how to draw conclusions based on their data analysis process.

General thematic content
a) Systematising data sets
b) Analysing qualitative data
c) Drawing conclusions

Learning experiences
- Theoretical presentation, with exercises and examples, for a) and b)
- Data processing and analysis for a) and b)
- Dialogue and discussion for b) and c)

Session development
It is suggested the training session be organised as follows:

Figure 40: Framework for analysing data, drawing conclusions, and formatting results for presentation

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
Before discussing conventional scientific data analysis systems, the facilitator leads the group through a discussion of the possible modes of systematising qualitative data. In a
co-enquiry setting, the conventional scientific processes for analysing and processing qualitative data (coding, transcribing, etc.) may be too time-consuming or complex for community researchers. In the Chinantla experience, the group used a combination of simple matrices and dialogue for the systematisation and analysis process. It is clear that some of the resulting analysis may lose some depth and complexity, yet it is also a system that is much more appropriate to community-based and co-enquiry processes.

The following is a general (and adaptable) matrix (Table 16) for systematising data arising from semi-structured interviews, oral histories and focus groups. A similar approach can be adopted for systematising and analysing broader ethnographic data, and in a future version of the present protocol a specific section on analysis of ethnographic data will be included.

In the Results column the research team will include an incipient analysis of the interview answers, draw tentative conclusions, and make connections between these conclusions and the research questions. However, in order to keep the process clear and simple, at the data systematisation stage, the research team should only fill in the Research Questions, Interview Questions and Answers column.

Table 19: Data systematisation matrix for semi-structured interviews

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Interview questions</th>
<th>Answers</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research question 1</td>
<td>Interview question 1</td>
<td>Person A</td>
<td>I think that…</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Person B</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Focus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Etc.</td>
<td></td>
</tr>
<tr>
<td>Interview question 2</td>
<td>Person A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Person B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
III. Practical exercise: processing our own data sets

During this session, the group works to fill in portions of this matrix with results from a methods practice session (whether the method was focus groups, interviews, or oral histories). The exercise can be carried out as a group, and led by literate members of the community research team. Ideally, the data would be systematised on a computer-based word processing software, as the resulting documents can be more efficient and user-friendly for the purposes of analysis. However, if this is not possible, it is suggested that the exercise be carried out using landscape-oriented flipchart pages and pens/pencils.

IV. Analysing results

- Exercise 1: Results analysis

In order to analyse results, the data systematisation matrix is used, and a process of patient and flexible dialogue, led by the facilitator, is used to elicit analyses. In the Results column the research team will include an incipient analysis of the interview answers, draw tentative conclusions, and make connections between these conclusions and the research questions. Connections between the results are made and notes of those are taken down on separate flipchart pages. This process may take a relatively long time, as it requires a constant back-and-forth between the facilitator and the researchers as the group allows analyses and conclusions to emerge.

- Exercise 2: Refining the analysis, the research questions and the method

Following this first step, a second matrix can be used to examine whether the conclusions drawn help to answer the original questions (Table 17). This second matrix also allows for further questions to emerge, allowing the group to refine their research and interview questions prior to field-based practice.

Adaptations

If the group is large, it is suggested that the group divide and that sub-groups engage in the process of analysis for each research question. However, as this process requires constant input by the facilitator, we suggest that more than one facilitator be available to ensure that each subgroup receive the support they need.

Conversely, in some cases (including the Chinantla) this training may only be relevant for those members of the community research team who are bilingual and literate. In other words, given the heavy accent on writing, it may be counter-productive to include members of the research team who do not have any training in writing and or systematic thinking.

If the large part of the group are monolingual, it is important to have an interpreter during results analysis. Often interpreters are youth or adults who have had secondary education. These interpreters will not only be necessary to support group dynamics but may also be a valuable support to the facilitator to understand group dynamics, motivations or doubts of the monolingual participants. They will also help with translating key concepts and thinking of appropriate imagery to translate complex ideas. They will need to dedicate extra time to working on the key words, transcribing written interviews and preparing materials. This means that they will have to dedicate more time than the others in the collaborative preparation of workshops. They therefore need to be motivated to participate!
Table 20: Data-research question comparison matrix

<table>
<thead>
<tr>
<th>Results</th>
<th>Overarching questions</th>
<th>Did we answer our questions?</th>
<th>If yes, how?</th>
<th>If no, how?</th>
<th>What other questions do I have?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This process can also be visualised as in Figure 27:

Figure 41: Have we answered our research questions?

Adaptations

During both these exercises, although especially Exercise 2, the research question and method is closely examined by analysing the kinds of results the research questions and methods have yielded. Both overarching research questions and the methods themselves are thoroughly revised at this stage, including through the re-drafting of interview questions so as to be more understandable to interviewees.

For example, in the Chinantla, the group found that the specific interview questions did not yield enough results to answer research question E, so they developed a new interview question in order to obtain more specific data. Moreover, they found that another interview question they had developed was too general resulting in answers that were too similar between interviewees, so they refined those interview questions and reflected on a variety of follow-up questions they could ask to obtain more precise information.

V. Refining the research process and assigning tasks

Once the final matrices for systematisation and analysis have been prepared for the group to use during field-based practice, the group assigns tasks within the community research team.
It is suggested that one or two brief day-long follow-up workshops are scheduled in order to (i) ensure that the systematisation and incipient analysis process is understood and underway, (ii) answer queries and resolve problems, and (iii) explore the need for further/different questions or methods.

Adaptations
In the Chinantla, we worked with a female translator who was also part of the research team to carry out the results analysis workshop. The exercises given in this protocol were adapted by the group to better suit their needs, given the very specific situation of having a community research team composed mostly of non-formally educated monolingual women. It is likely that the slightly more complex approach described in this section could be understood more easily in the case of a community research team with a slightly greater level of formal education.

A few days prior to the workshop, the facilitator met with the translator to translate all of the interview answers and write them in the Chinantec language. The key words from the interview responses were transposed, in Chinanteco, on a blank card. On the back of the card were written the code for the interviewee and the number of the question being analysed. Together, the translator and facilitator devised an exercise to help the team group the answers together, and planned how she would carry out the translation and explanation for the rest of the team. The next day, all the team members were invited to the workshop and the translator explained that the work would be carried out in Chinanteco.

In the mean time, the group prepared flipchart pages with each question written at the top. With the help of the translator, the group then reads each question and assigns answer cards (in Chinanteco) to the respective questions. Team members were then asked to stick each answer by the appropriate question, grouping the answers according to similarity (similar answers to the same question were grouped together). For example, one of the questions that the community research team had devised for the interview was “How did you live prior to conservation?”. The resulting answers, summarised in Chinanteco key words were “we lived happily” (9 answers); “we lived in poverty” (8 answers); and “we lived in houses made of rustic materials” (2 answers).

Once the answers have all been organised per question on the flipchart pages on the wall, the facilitator and translator begin a dialogue, using the following questions, amongst others:

- What does it mean when many answers to a particular question are similar?
- Why do some questions only have one or two groups of answers?
- What does it mean when some questions have not been answered by all respondents?

Following this initial appreciation of the question-answer relationship, the group begins to analyse and discuss the answers for each question using a group dialogue. The answers for each question will be summarised and ideas regarding what these answers mean will be discussed. The specific and important issues relating to each question will naturally arise through dialogue, and will be taken note of throughout the session. The most important aspect of this element of the analysis is that everyone is sharing opinions and reflections regarding the themes that the questions have elicited. Here, the support of the translator is essential, as it ensures wide participation and a good understanding of the question-answer relationship.
Example of a work plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 1 hours, AM</td>
</tr>
<tr>
<td>III. Processing our data</td>
<td>Day 1. 1 hour, AM.</td>
</tr>
<tr>
<td>IV. Analysing our results</td>
<td>Day 1. 3-4 hours, AM and PM</td>
</tr>
<tr>
<td>V. Establishing a complete process and assigning tasks</td>
<td>Day 1. 1 hours, PM.</td>
</tr>
</tbody>
</table>

Equipment and materials
- All the notebooks and transcriptions from the data collecting period.
- Pencils or pens and A4 paper
- Flip chart paper
- Marker pens
- Projector and computer, if available

Participatory mapping

Addresses objectives:

Objective A. To document the most important changes in community life according to its members.

Objective C. To document current livelihoods and wellbeing status among community members and changes in this status over time.

Basic participatory mapping for community biocultural territories

Session objectives
To train community researchers in participatory mapping techniques that allow them to map the biocultural elements of their territories. As a result of the session, the community researchers will have the cartographic tools required to engage in problematising dialogue (Method 2) and systemic analysis (Method 3) of governance and land use change in their community territories.

Facilitators
The participatory mapping training should be led by an external or local team member with abilities to lead a group discussion and with expertise on participatory mapping techniques and processes (for more methodological information on participatory mapping see CTA 2006, 2010; Tobias 2000, 2010)

Participants
9. Local research team and any other community member interested in the use, management and changes of the territory.
10. Special attention must be given to integrate different social groups of the community into the workshop, such as women, young people and elders, as they can provide different views of the territory according to their own needs and activities.

Expected results
At the end of the session, the participants will have acquired basic abilities to generate diverse participatory maps of their biocultural territories.

General thematic content
- a) Concept, history, uses and importance of maps;
- b) Types of maps and kind of information that they include;
- c) Mapping general concepts;
- d) Use of GPS devices;
- e) Elaboration of maps;
- f) Revision of existent maps.

Learning experiences
- Theoretical presentation for themes a) - d)
- Practical exercises and group dialogue for d) - f)
- Focus groups for reflection and analysis for a) - f)

Session development

It is suggested the training session be organised as follows:

Figure 42: Framework for training community researchers in basic mapping methods

I. Introduction
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. Theoretical revision
The facilitator provides the theoretical background on (i) concept, history, uses and importance of maps; (ii) importance of maps regarding territorial management and land use change; (iii) map types (community, official, hydrological, vegetation, biocultural, etc.); (iv) the type of public and private information that can be included in maps. During this section, dialogue and participation by the rest of the team should be encouraged to make questions and propose ideas or previous concepts about mapping. It is recommended that time should be taken to discuss all the information that should and shouldn't be included in the maps, according to community agreements or desires.
**Exercise:** The facilitator works with the rest of the team to create a mental geographical map of the territory and land use. This map is the first attempt to draw on paper the participants' perception of the territory. The map is drawn freely by the team on white flip chart paper and should include territorial borders, the urban area, the water bodies, agricultural zones, zones for cattle or any other animal raising, cultural or spiritual important places, etc. Once the map if finished, the facilitator promotes a dialogue about the map, what can we see now that is not very evident in our daily lives? What information is missing?

The second part of the theoretical revision is closely related to the practice of map elaboration (see next section). It covers the basic concepts of conventional mapping, such as coordinates systems, scales, level curves, orientation, legends, etc. Accuracy and precision are also discussed, highlighting the differences between the two concepts, and why and when to use them (see box below). For example if the map is for official use, accuracy is preferred over precision, while if the map is for local use, precision is enough and it is also preferred (i.e. knowing the place where a water body is located).

### III. Elaboration of maps

The only way to fully understand the theoretical concepts and definitions is for the team to put it into practice by creating maps. In the Chinantla case study, several map elaboration exercises were implemented.

We use official maps of the Mexican Institute for Statistics and Geography (INEGI) and of the Agrarian National Registry (RAN) to locate the community territory on accurate geographical coordinates. Over this base, using tracing paper, the team drew a first map of community territory boundaries. Next, the team practised the use of different scales and created maps of different sizes.

Once they learned how to draw maps using the respective coordinates without the use of another official map as a base, the team proceeded to elaborate various maps according to the communities' requirements. For example, the team draw a land use map, a map of the different water bodies, as well as maps of vegetation types and of fauna populations (see protocols on vegetation and fauna monitoring for specific examples).

The elaboration of these maps must be accompanied by the use GPS devices for further accuracy and precision; for example the GPS will allow to locate

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**Some definitions**

(Adapted from Foote and Huebner 2000).

**Accuracy.** Degree to which information on a map or in a digital database matches true or accepted values. It is possible to consider horizontal and vertical accuracy with respect to geographic position, as well as attribute, conceptual, and logical accuracy.

**Precision:** Refers to the level of measurement and exactness of description in a GIS database. Precise locational data may measure position to a fraction of a unit. Precise attribute information may specify the characteristics of features in great detail. Precise data may be inaccurate, for example, surveyors may make mistakes or data may be entered into the database incorrectly.

the limits of vegetation types, productive parcels, etc. Therefore, a session on the use and management of GPS devices must be included in this training. This training should cover, at the very least: (a) explanation of the GPS technology; (b) use of GPS windows and functions; taking and saving points in the field; (c) moving from one coordinate system to another; and (d) transferring GPS information into paper maps.

The final aim of this process is to build several layers of maps to have a biocultural cartographic compendium of the different cultural, environmental and biological elements of the community territory and its members’ daily lives. This can be done simply by drawing each map separately, according to the themes chosen by the research team and/or the community.

IV. Methods adaptation and revision

Once the team has practised how to elaborate mental maps and thematic community maps, the facilitator will promote a reflection about the methods. The reflection can be done through a two-way questions and answers session (facilitator <> rest of the team). Some key questions that could be discussed are as follows:

I. Do you think that using these mapping methods, the team can capture all the elements and information held within the territory?
J. What information is missing?
K. What other ways could be used to represent our territory?
L. What could this information be useful for?
M. What are the possible negative outcomes of using participatory mapping (misrepresentation and/or simplification of the complex indigenous notion of territory, creating conflict between communities, divulging information to outsiders, etc.)
N. What difficulties we had during the methods application?
O. How can we solve these difficulties?

Furthermore, the facilitators must be attentive to any difficulty or opportunity that arises during the methods practice, to discuss it during this session.

V. Revision of existing maps

Revision of existent official or not official maps is important both as a mapping practice and as an exercise in analysis of the precision of maps created by other actors or stakeholders. The first step of this exercise is to locate the different maps that have been elaborated for the local territory; these can come from government archives, historical records, conservation projects, NGOs, etc. The group makes a list of the different maps they know of while the facilitator provides support by searching electronic and bibliographical databases, if those are not easily available to the community researchers. Once the list is made, the team identify which maps can be printed and obtained for the community and which maps are of most interest to them for analysis. In the Chinantla case, the maps of most interest where those related to conservation areas and payments for environmental services, created by official institutions and conservation NGOs, along
with the agrarian maps of community boundaries. Once a physical copy of the map is in
the community, the team proceeds to review it.

Some questions that may be useful to encourage analysis during this revision are:

- Is there any difference between our previous perception of the territorial elements
  and how they are represented in these other (often official) maps?
- Who produced the maps?
- Where did their information come from?
- What kind of technology did they use to elaborate the maps?
- What information do we think is not accurate or precise? Why? How can we
  prove its inaccuracy or lack of precision?
- Would we like to update or re-elaborate some of these maps?

VI. Task assignment
Mapping techniques can be extensively explored and practised according to local needs
and chosen work themes. Participants suggest a schedule for implementing further
mapping revision or elaboration and a list of possible willing participants from the
community to invite.

Example of a work plan
Due to the nature of the mapping work, for which detailed information has to be
gathered in the field and captured on paper, different sessions can be planned scattered
along a couple of months. It will depend very much on the time availability of the local
research team and the availability of the supplies (especially the external maps). The
following is just an example for a continuous workshop, assuming that time is not a
constraint and that the team has all the necessary material.

<table>
<thead>
<tr>
<th>I. Introduction</th>
<th>Day 1. 15 mins, AM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. Theoretical revision</td>
<td>Day 1. 2 hrs, AM.</td>
</tr>
<tr>
<td>Concept, history, uses, importance and types of maps. Kind of information that can be mapped</td>
<td></td>
</tr>
<tr>
<td>Day 1. 3 hr, AM.</td>
<td></td>
</tr>
<tr>
<td>Practical exercise – mental map.</td>
<td></td>
</tr>
<tr>
<td>Day 2. 2 hrs, AM</td>
<td></td>
</tr>
<tr>
<td>Concepts of conventional mapping</td>
<td></td>
</tr>
<tr>
<td>III. Maps elaboration</td>
<td>Day 2. 2 hrs, AM</td>
</tr>
<tr>
<td>Community territory boundary map using official maps as a base.</td>
<td></td>
</tr>
<tr>
<td>Maps at different scales.</td>
<td></td>
</tr>
<tr>
<td>Day 2. 2 hrs, PM</td>
<td></td>
</tr>
<tr>
<td>Basic use and management of GPS</td>
<td></td>
</tr>
<tr>
<td>Day 3. 4 hrs, AM</td>
<td></td>
</tr>
<tr>
<td>Thematic maps</td>
<td></td>
</tr>
<tr>
<td>Day 4. 6 hrs.</td>
<td></td>
</tr>
<tr>
<td>Taking GPS points in the field and transferring to thematic maps.</td>
<td></td>
</tr>
<tr>
<td>IV. Methods adaptation and</td>
<td>Day 5. 1-2 hrs, AM</td>
</tr>
<tr>
<td>revision</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>V. Revision of existing maps</td>
<td>Day 5. 2 hrs, AM Verification of existing maps</td>
</tr>
<tr>
<td></td>
<td>Day 5. 4 hrs, PM Updating or re-elaboration of existing maps.</td>
</tr>
<tr>
<td>VI. Task assignment</td>
<td>Day 6. 2 hours, AM</td>
</tr>
</tbody>
</table>

**Equipment and materials**

- Flip chart paper
- Tracing paper
- Colours
- Pencils or pens
- Marker pens
- Rulers
- Compass
- Small notebooks for the field-based
- Copies of maps created by/for official institutions, conservation projects, NGO organisation, historical processes.

**Participatory mapping of the community’s strengths, vulnerabilities, opportunities and threats**

**Session objectives**
To train community researchers in the use of participatory mapping techniques to help visualize the community’s strengths, vulnerabilities, opportunities and threats. As a result of the session, the community researchers will have the cartographic tools required to engage in dialogue (Method 2) and analysis (Method 3) of governance and land use change in their community territories.

**Facilitators**
The participatory mapping training should be led by an external or local team member with abilities to lead a group discussion and with expertise on participatory mapping techniques and processes (for more methodological information on participatory mapping see CTA 2006, 2010; Tobias 2000, 2010).

**Participants**
- Local research team and any other community member interested in territorial use, management and changes.
- Special attention must be given to integrate different social groups of the community into the workshop, such as women, young people and elders, as they can provide different views of the territory according to their own needs and activities.

**Expected results**
At the end of the session, the participants will have:
- Acquired the ability to represent, on cartographic maps, the strengths, vulnerabilities, opportunities and threats for the territory and the community.
The tools to analyse land use change, as well as territorial opportunities and threats for livelihoods and wellbeing.

**General thematic content**

a) SWOT Analysis;
b) Current and historical strengths, vulnerabilities, opportunities and threats for the territory;
c) Historical analysis.

**Learning experiences**

- Theoretical presentation for themes a) and c)
- Practical exercises and group dialogue for b) and c)
- Focus groups for reflection and analysis for b) and c)

**Session development**

It is suggested the training session be organised as follows:

I. **Introduction**
The facilitator will provide the group with an introduction that covers (i) the purpose of the workshop, (ii) themes tackled by the workshop and how they will be addressed, (iii) length of the session, (iv) structure of the session, (v) outcomes of the session, etc.

II. **Theoretical revision**
In this section, three theoretical issues will be addressed:

- A common language for the research process
- SWOT analysis
- Historical analysis

A common language for the research process

The first step in this theoretical revision is to reach a common understanding for the process. Often external academics are used to freely deploying scientific and technical language without taking into account that most local people may not understand it. This section is not aimed at teaching or transferring the scientific and technical words to the community researchers, but rather at reaching a common understanding, between facilitators and community researchers, of how to name particular processes, objects, tools, approaches, etc.

For the purposes of this protocol, we propose to determine a common language for some concepts and for what that mean regarding territory and natural resources. For each one of these, the facilitator will promote an exchange of ideas: dialogue is encouraged to
analyse the differences between the external and the local definitions to pursue the main objectives of this workshop.

The proposed terms for discussion are:

- Territory
- Opportunity
- Strength
- Vulnerability
- Threat

The team's work to define mutually understood concepts will continue throughout the workshop, as and when it is needed.

The facilitator must be aware that some words may have a stronger political load and therefore may need more time to be defined.

As a first result of this exercise, the team should adapt the language used during the rest of the process.

**SWOT analysis**

SWOT are the initials for Strengths, Weaknesses, Opportunities and Threats. SWOT is an analytic tool that helps to provide a diagnosis of a specific reality. The tool has its origins in corporative planning, yet given its usefulness it has been widely welcomed and used in action-research processes. For the purpose of language adaptation, we have chosen to use the word 'vulnerability' instead of 'weakness'. The concept of 'vulnerability' allows to see the community or the territory as 'vulnerable' in front of other elements, that are important to consider in the analysis, and not just 'weak' due to internal causes.

At this stage, using the language previously decided upon by the group, the facilitator explains that a SWOT analysis will allow to make a diagnosis of internal factors (strengths and vulnerability) and external factors (opportunities and threats) that result in the present conditions of the given theme/object/system under scrutiny. Linking a SWOT analysis with maps enables the community researchers (and other community members) to engage in a visual representation connected with a diagnosis of the natural resource and landscape conditions.

**Historical analysis**

The facilitator explains that an historical analysis involves inquiring into how any given condition changes throughout time. In complement with the SWOT analysis, the historical analysis allows the community research team to examine how the strengths, weaknesses, opportunities and threats they have revealed have changed over time. It is useful to give a set amount of time (5, 10 or 20 years depending on the average age of the community researchers and the objective of the historical analysis – see below for the Chinantla experience) within which to carry out this analysis.
III. Elaboration of maps
The elaboration of maps at this stage will be used for two purposes:

- the Strengths, Vulnerabilities, Opportunities and Threats analysis
- the historical analysis

(i) Maps for Strengths, Vulnerabilities, Opportunities and Threats analysis
Using the mapping tools learned in the basic mapping training, the facilitator asks the research team to create a general map of the territory on a piece of flipchart paper. The map should have basic geographical elements such as community boundaries, main water bodies, main mountains or hills, the urban area, main roads, and landscape units.

Over the top of this first map, two map layers will be created using 2 sheets of tracing paper. Resources and their uses will be identified on the first layer; the facilitator helps to identify resources and processes that constitute a strength for the community. For example: What resources do we use to support our livelihoods? What resources or productive areas provide us with income? What resources, landscape units, and processes – such as water, forests, particular soils, etc. – support general ecological-territorial function?

On the second layer of tracing paper, the vulnerabilities, threats and opportunities are captured. When identifying these, special attention must be given to external and internal initiatives and projects that are present in, or relate to, each landscape unit. On each sheet, marks, labels, signs and icons can be drawn to identify the different elements.

(ii) Maps for historical analysis
For the purpose of this analysis, the research team needs to get satellite images or geographical maps of 20 and 10 years ago. These dates have been set for the Chinantla, as 20 years ago represents a period when no formal conservation strategies were in place while 10 years ago, formal conservation strategies began. If the budget allows it, satellite images for those periods are very useful, as they allow the team to examine vegetation cover changes and other land use changes. If the map has to be drawn, community elders ought to be interviewed by the community researchers in order to explore the land use distribution for those periods and how it has changed (see CRP on Basic Social Science research methods [p.183-227] for an approach to co-enquiry-framed semi-structured interview methods).

Then, another general map is drawn, this time with the current information, yet has to include the same elements as the historical maps, to ensure comparison. That is, if the map of 20 years ago shows agricultural fields as one of the elements, then this map has to show them too. An updated satellite image can be used too to corroborate the information on the current maps. The comparative analysis process is briefly described below.

IV. Map analysis

- Analysis of Strengths, Vulnerabilities, Opportunities and Threats
For the purpose of this analysis, we propose the method of problematising dialogue (see p.229-230); this method allows the participants to engage in a deeper reflection, have their interest awakened and generate more elements regarding the local relevance of the work. To carry out this dialogue, we use the methodological tool of 'Generator themes' (Freire 1975), which are key work themes around which a deep dialogue can be developed, that ramify into or reach many other subjects important for the group.

In this case, the generator themes are the territory and its resources, as well as the strengths, vulnerabilities, opportunities and threats identified in the earlier process. To conduct a problematising dialogue using generator themes, a support object is used to launch the dialogue. In this case, the support object is the map itself, which can be used to catalyse the start of the dialogue by posing questions regarding concrete elements of the maps. From the moment it has started, the conversation will develop according to the group's interests. The facilitator must be very attentive to identify these interests, pose key questions and guide the dialogue to deepen the emergent themes. During the whole process one person has to take notes of the entire dialogue, highlighting the most important points in a synthesis at the end of the workshop. We propose the use of a table such as the below to record the information emerging from the problematising dialogue in a systematic way:

<table>
<thead>
<tr>
<th>LANDSCAPE UNIT</th>
<th>Resources</th>
<th>Uses</th>
<th>Strengths and Opportunities</th>
<th>Vulnerabilities and Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>Wood</td>
<td>House and furniture building</td>
<td>A possible forest management plan. The forest in good health.</td>
<td>Illegal logging. Payments for Environmental Services.</td>
</tr>
<tr>
<td>Firewood</td>
<td>Cooking and heating</td>
<td>Enough wood to ensure adequate supply of firewood for the community.</td>
<td>Payments for Environmental Services.</td>
<td></td>
</tr>
<tr>
<td>Animals</td>
<td>Food</td>
<td>Creation of formal management units.</td>
<td>Lack of information about populations.</td>
<td></td>
</tr>
<tr>
<td>Acahual (secondary forest)</td>
<td>Animals</td>
<td>Food</td>
<td>Game</td>
<td>It seems that there are many animals.</td>
</tr>
<tr>
<td>Coffee plantation</td>
<td>Coffee</td>
<td>Sale</td>
<td>Local consumption</td>
<td>A local cooperative.</td>
</tr>
<tr>
<td>Agricultural zone</td>
<td>Soils</td>
<td>Milpa cultivation</td>
<td>Is our main productive resource.</td>
<td>Lack of information on how to improve productivity, pests and diseases, lack of information on how to improve post harvest.</td>
</tr>
</tbody>
</table>

Table 1: Example of information table on resources, uses, strengths, vulnerabilities opportunities, and threats

Once the table is finished and to close the analysis, the facilitator encourages the team to:
• Dialogue about the synthesis table, briefly reviewing the main concepts and their relation with the basic map.
• Identify and write down a list of the main threats and vulnerabilities.

• Historical analysis
Once the team has two or three maps showing what the territory looked like at different moments in recent history, the facilitator encourages the team to analyse these using a “spot the differences” game. The facilitator promotes dialogue by asking questions like: What can we find in one map that is not found in the other? Why has this change happened? What has been the effect of this land use change in our livelihoods and wellbeing?

V. Methods adaptation and revision
Once the team has been able to practice elaborating and analysing, the facilitator encourages a reflection regarding the methods. The reflection can be done using a two-way questions and answers session (facilitator <> rest of the team). Some key questions that may be useful to discuss:

A. Do you think that through these mapping methods and analysis, we are able to understand all the processes that take place in our territory?
B. What information is missing?
C. What could this information be useful for?
D. What problems or difficulties have we encountered during methods application?
E. How can we solve these problems?

Furthermore, the facilitators must be attentive to any difficulty or opportunity that arises during the methods practice, and bring it up for discussion during this session.

Example of a work plan
Due to the nature of the mapping work, for which detailed information has to be gathered in the field and captured on paper, different sessions can be planned scattered. It will depend very much on the availability of the local research team (time-wise) and of the supplies (such as the satellite images). The following is just an example for a continuous workshop, assuming that time is not a constraint and that the team has all the necessary material.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>Day 1. 15 minutes, AM.</td>
</tr>
<tr>
<td>II. Theoretical</td>
<td>Day 1. 1-2 hrs, AM.</td>
</tr>
<tr>
<td>revision</td>
<td></td>
</tr>
<tr>
<td>III. Maps</td>
<td>Day 1. 2 hrs, AM.</td>
</tr>
<tr>
<td>elaboration</td>
<td>- Maps for analysis of Strengths, Vulnerabilities, Opportunities and</td>
</tr>
<tr>
<td></td>
<td>Threats</td>
</tr>
<tr>
<td></td>
<td>Day 1. 2 hrs, PM.</td>
</tr>
<tr>
<td></td>
<td>- Maps for historical analysis</td>
</tr>
<tr>
<td>IV. Maps</td>
<td>Day 2. 3 hrs, AM.</td>
</tr>
<tr>
<td>analysis</td>
<td>- Analysis of Strengths, Vulnerabilities, Opportunities and Threats</td>
</tr>
<tr>
<td>V. Methods adaptation and revision</td>
<td>Day 3. 2-3 hrs, AM.</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>

**Equipment and materials**

- Flip chart paper
- Tracing paper
- Colours
- Pencils or pens
- Marker pens
- Rulers
- Compass
- Any other maps of the local area (official, NGO, etc.) that have been created and that are available
- Copies of satellite images of different dates and/or geographical maps from different dates.
In this section, we present novel approaches to engaging in co-enquiry social research with communities. These two methods – TRIZ and problematising dialogues – are aimed at analyzing current realities, solving problems, and exploring future scenarios of change. In this brief introduction we provide some theoretical background on the two methods and how they can be integrated.

The first is the problematising dialogue process, adapted from Paulo Freire’s pedagogical approach amongst others; see Freire (1975/2007). Problematising dialogue is an ideal fit for a co-enquiry approach as it both challenges accepted wisdom and acts as a democratic, collective learning and reflection process. Implementing these dialogues in small groups allows all members of the community to participate yet gives them more freedom to express their opinions and reflections (which they tend not to do in community-wide settings). This dialogic approach may be complemented by the creation of a number of different participatory maps (see CRP on Basic Social Science Methods that help communities visualise how aspects of socio-environmental change impact their livelihoods and wellbeing.

TRIZ – the Theory of Inventive Problem Solving – is the second key methodology and tool upon which this protocol is built. TRIZ is the Russian acronym for Theory of Inventive Problem Solving. It was developed progressively by G.S. Altshuller between 1946 and 1998 (Khomenko et al 2007) in the context of inventions in engineering. It sought to establish a method for systematic analysis, problem-solving and planning for the future. Since the 1980s, it began to be used also in non-engineering contexts. As attempts were made to generalise the use of TRIZ to non-engineering spheres of life, researchers identified its limits in these spheres and sought to improve TRIZ’s ability to solve complex cross-disciplinary problems. Altshuller then proposed to transform classical TRIZ into a more general approach for problem solving, proposing the name of General Theory for Powerful Thinking, the Russian acronym of which is OST (Atshuller 1994, 1973; Khomenko et al 2007).

In the Chinantla context, the GDF team adapted elements of the TRIZ-OSTM toolbox to help communities resolve their problems, analyse socio-environmental change and plan for the future in the realm of natural resource governance, land tenure, livelihoods and wellbeing. One particular element of the TRIZ-OSTM toolbox has been used with great success in the Chinantla as communities have sought new ways of understanding the significant socio-environmental changes they are facing and new ways of addressing the resulting problems and inherent contradictions. This is the System Operator, or 9 windows, which will be discussed in greater depth shortly. The System Operator offers a
structured process for analysis of components and functions of a system\textsuperscript{17} and its relationship with its broader context as well as its content.

As far as we know, no instrument from the toolbox of participatory methodologies synthesises in one table the shared knowledge of the past, present and future of a system, its components (parts) and its context. Originally, the System Operator was created by engineers, for engineers – i.e. people with a basic knowledge of systems and the material laws of nature. The literature that examines its use in an adult context comes from the spheres of engineering and inventions; it is also used by practitioners and academics dedicated to problem-solving. However, the use of OSTM with children has been documented as part of an ample and ambitious programme of early schooling (pre-school and primary school), indicating both that it is not inherently complex and it has proven pedagogic uses. The literature shows no indication is has been used, prior to this COMBIOSERVE project, for addressing broader questions surrounding human life and our environmental context.

The System Operator has the flexibility to analyse living things, tools, human activities, and landscape units, amongst others; in effect, it can be used to analyse any system determined by the observer. The System Operator is a tool for both analysis and ‘problematisation’ (see below). Users of the System Operator can mentally organize a system, its components and its context, in order to analyse its behaviour in the present, past and future. Once information is elicited and organized, users can proceed to ‘problematize’ changes and trends in the system. In this way, the System Operator can be used to identify the functions of a system as well as what it requires in order to fulfil its role. The principal reason the System Operator is so effective in analysing a system or problem is that it provides clarity on the context, functions and components of the issue being analysed. It helps cut through the complexity of real life in order to shed light on the core problem, therefore rendering the search for solutions more systematic and lucid. It is also a relatively easy tool to explain and to learn, and can be extracted from the TRIZ-OSTM toolbox and used without requiring greater theoretical contextualisation.

The System Operator and problematising dialogue approaches go hand-in-hand, and are presented in this methods protocol as an integrated process. Problematising dialogue is the key first step used by community researchers to critically appraise their reality, the problems they encounter both in their daily lives as community members and community researchers, and the implementation of the methodology itself. The System Operator then provides the method for analysing reality and seeking solutions to problems encountered.

\textsuperscript{17} A system is is a set of interacting or interdependent components forming an integrated whole. It has spatial and temporal boundaries and is influenced by its environment. In order to understand better the functioning and characteristics of any system, and therefore have more conceptual tools to apply in the System Operator workshop, we recommend further reading on Systems Theory, particularly von Bertalanffy 1968 and Varela & Maturana 1973, 1974
Problematising dialogue

Addresses objectives:

Objective B. Document the drivers of these changes

Objective D. To document community members’ approaches to deal with impacts and utilize opportunities arising out of the changes their community is facing

Objective E. Explore possible trajectories of change under diverse future environmental, social, political and other scenarios

Objective F. To support community efforts as members reflect on the connection between research results and community decision-making processes

The problematising dialogue process does not benefit from a highly structured set-up, which is why this section is discursive and not structured like the other protocols. Here, facilitators and participants are equal co-learners, and the dialogue is launched using generator themes that arise among the participants (although some suggestions are made below). Anyone interested in the dialogue participates. There are no specific outcomes expected, and in practice every dialogue is uniquely informed by the participants’ conditions, location, ethnicity, diversity, personalities, and so on. Naturally, as it is a dialogue, the key principles of mutual respect, open communication, and allowing all participants the space to speak are essential.

The problematising dialogue uses critical thinking, pedagogical dialogue and a shift in perspectives to pose questions about a given situation, existing knowledge, accepted wisdom, or a problem at hand. To ‘problematize’ an issue in dialogue is to challenge every participant in the dialogue (including community members, community researchers and facilitators) to approach the issue radically differently. This is done first by recognizing, acknowledging and challenging and their prejudices, assumptions and expectations with regard to the issue, including those arising from knowledge and information available from ‘authoritative’ sources, such as academic sources, government, community authorities, etc. The specialist knowledge of the facilitation team must also be put through this process of doubt.

Themes proposed for problematising, are often called ‘generator themes’ in Freirean pedagogy. These themes are usually words or phrases that represent issues of vital importance for the individuals and/or community in question. The process of determining generator themes can benefit from props, such as images, videos, maps, puppet shows, audiotapes, objects, or whatever else is chosen by the participants. For example, in the context of Chinantec communities, whose lives were at the time dominated by questions surrounding the Payments for Environmental Services (PES) programme, a key generator theme would be ‘conservación’ as this was the local term for referring to the PES programme. Simultaneously, a useful prop would be the map of the PES areas and their overlap with community territorial use zones.
Using these generator themes, the problematising dialogue examines the relationships between the theme and the different spheres of reality – economic, political (what can be done), cultural, spiritual, and environmental – in the community. It reveals the relationships between the theme and the different actors, times and scales that are directly or indirectly involved in it.

Some of the basic questions to launch the problematising dialogue on the chosen theme include, amongst others: Why are we addressing it? How? For whom? What outcome do we hope to achieve? Who is here, addressing it? Who is missing? Any basic question surrounding the event of the dialogue itself is welcome, and participants are encouraged to pose these questions themselves. Other questions that help challenge and critically appraise the issue at hand can be:

- When did the problem start? How did it start? How is the problem maintained (how does it continue)?
- Where did it start? Does it take place at another scale: household, neighbourhood, town, region, state, county, continent, planet?
- Why does the problem happen? What or who causes it? What are the economic, political, cultural, spiritual or environmental causes?
- What are the economic, political, cultural, spiritual and environmental consequences?
- Who participates in the problem? Who or what suffers its consequences? Who are what maintains it? Who are what benefits from it?
- How are we dealing with the problem? Are there people who have more experience in dealing with these problems?
- And so on…

### The System Operator of TRIZ-OSTM

**Addresses objectives:**

**Objective B.** Document the drivers of these changes

**Objective C.** Document current livelihoods and wellbeing status among community members and changes in this status over time

**Objective E.** Explore possible trajectories of change under diverse future environmental, social, political and other scenarios

### ‘System Operator’ workshop

**Session objectives**

To train community researchers in the use of the System Operator as a tool of analysis and for future planning. In the context of COMBIOSERVE, the workshop has been used for land management planning, and decision-making surrounding governance. This protocol was developed in a workshop in the Southern Bahia fieldsite, with Pataxó community researchers and with Chinantec community researchers in the Chinantla.
Facilitators
The System Operator workshop must be facilitated by an external facilitator who is knowledgeable in the process and able to explain it easily to people with little or no formal education. Through the process, community researchers ought to be able to learn how to lead the process themselves, and therefore facilitate future workshops.

Participants
Local research team and any other community member interested in analysing socio-environmental change and planning for the future.

Expected results
At the end of the session, the participants will have:
- Understood the functioning and uses of the System Operator;
- Acquired the ability to implement the System Operator to analyse realities and plan for the future

General thematic content
The System Operator or 9 windows – theoretical and practical

Learning experiences
- The simple theory behind the System Operator
- Practical implementation of the System Operator
- Group dialogue to reflect on the experience

Session development
It is suggested the training session be organised as follows:

Figure 44: Framework for training community researchers in the use of the System Operator

I. Introduction and brief theoretical overview
The System Operator can be introduced for analyzing simple systems that the community researchers are familiar with, for example a living being, a tool and a human activity in a particular community conserved area. The objective of this workshop is to provide a new way of analyzing land use management and governance and to predict how socio-environmental changes may affect communities in the future – i.e. human activities. However, in this protocol we suggest that the team analyse a living being and a tool as well as a human activity of interest to the community, as the first two are ideal
examples with which to learn the process. The facilitator gives the group the choice as to which living being, tool or human activity they wished to analyse in the workshop.

Adaptations
The Pataxó community researchers chose to analyse a hawk, a machete and the production of crafts. They chose not to use the term 'analyse', as they were speaking of a living being, but rather 'recognise', given that in this case they all knew what a hawk was but they sought to use the tool to 're-cognise' it in a new way.

The workshop facilitator begins by explaining the System Operator to the group. The System Operator is also known as the ‘9 windows’: it uses a table composed of 9 cells as its principal visual organising instrument. The dynamic involves facilitator asking the group a series of questions, which the group works collectively to answer. Responses are written on a flipchart by a rapporteur, in view of all.

Table 9 (below) shows the general scheme of the System Operator. It indicated the general questions posed about the system, and the order in which they are posed (the numerical order). Window 1 is the window that presents the system under discussion; the other 8 windows relate to the context and components of the system, as well as its past and its future states.

Table 21: general scheme of the System Operator

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4. What was it?</td>
<td>1. What is it?</td>
<td>7. What will it be?</td>
</tr>
<tr>
<td>Description of the system in the past.</td>
<td>Description of the system in the present.</td>
<td>Description of the system in the future</td>
</tr>
<tr>
<td>What did it do?</td>
<td>What does it do?</td>
<td>What will it do?</td>
</tr>
<tr>
<td>5. What were its parts?</td>
<td>2. What are its parts?</td>
<td>8. What will its parts be?</td>
</tr>
<tr>
<td>PAST</td>
<td>PRESENT</td>
<td>FUTURE</td>
</tr>
</tbody>
</table>

II. Practice of the System Operator using a living being as an example
In order to explain what the ‘9 windows’ are and how they work, the workshop facilitator demonstrates how they might use the schema for analysing a living being. In the case of an initial workshop on the System Operator, the questions are asked and answered in the order shown in Table 10 (below), as this sequential approach helps introduce the tool.

Table 22: The System Operator explained using a simple example of a living being

<table>
<thead>
<tr>
<th>1. Place where the being lives at the beginning of its life</th>
<th>6. Place where the being lives when mature.</th>
<th>9. Place where the being lives at older age</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. The being at the beginning of its life.</td>
<td>4. The living being when it is mature.</td>
<td>7. The being at older age.</td>
</tr>
<tr>
<td>3. The living being's parts(^{18}) at</td>
<td>5. Parts of the living being</td>
<td>8. Parts of the living being at</td>
</tr>
</tbody>
</table>

\(^{18}\) Here and in all of the examples used in the workshop, we purposefully used the simple term 'parts' rather than the more appropriate term 'components' because the former is more understandable by a heterogeneous
In the context of a living being, the questions that can help find answers for each cell can be as follows:

1. Where is the living being born?
2. What is the living being like when it is born?
3. What parts does it need to be born? What function/use does every part have?

The above questions all fall into the first column of the ‘9 windows’, that which covers the past conditions of the system – i.e. the living being at the beginning of its life. For the second column, which concerns the living being when it is mature (in the present), the following questions can be asked:

4. What is the mature living being like? What are the most important activities of the mature living being?
5. What are the parts that make it up? Describe its parts. What function/use do the parts have?
6. Where does the mature living being live?

For the third column, which covers the living being at the end of its life (i.e. the conditions of the system in the future), the following questions can be asked to complete the 9 windows:

7. What is an old living being like? Describe it. What can it no longer do?
8. What are its body parts like? How have they transformed?
9. Where does it live? How does its life end?

III. Repeat practice using a tool as an example

Having used this very simple example of a living being to illustrate the basic workings of the System Operator, the workshop facilitator explains the System Operator in more conceptual terms, using the example of an object. Effectively, in order to fully understand how to use the System Operator to identify the functions of the system under analysis and the needs it satisfies, the best example to use is that of a tool.

However, in this second iteration of the example, the facilitator will follow the more appropriate order of the System Operator, as indicated in Table 9. The first ‘window’, in the centre of the matrix, is where the object is named. Then, as Table 11 below explains, the subsequent ‘windows’ are generated and their questions can be asked, in the numbered order given.

Table 23: The System Operator explained using an object or tool

<table>
<thead>
<tr>
<th>6. Place where the activity took place with the object</th>
<th>3. Place where the activity takes place with the object</th>
<th>9. How will the place be in the future</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. The object’s past,</td>
<td>1. Name the object and</td>
<td>7. How will the object be in</td>
</tr>
</tbody>
</table>

group of people (i.e. some with formal education, some without). Please see the Lessons Learned chapter for further explanation.
Using the System Operator to analyse a tool, the group can base their analysis on the fact that the tools used today have a function and fulfil a need. In the past, either a primitive version of the same tool was used, perhaps with different components, or a completely different tool was used. In the future, humans may use a modified version of the same tool as today, or a completely different tool.

**Adaptations**

In the example of the Pataxó community research team, they recognized the machete as the tool to examine. After analysing the contemporary machete and its multiple functions, the group chose one function to analyse both in the past and the future. They chose to analyse the agricultural function of the machete – i.e. its function to cut vegetation for the creation of a swidden plot. This same function was fulfilled in the past by the stone axe and fire; in the future it could be fulfilled by the tractor, a chainsaw, herbicide or agroforestry techniques that do not require such an aggressive approach to removing vegetation.

The analysis of a tool stands in contrast with that of the living being, which is far more adapted to one specific context, although the interaction between the living being and its context is more complex. However, in the case of a tool, the facilitator explains that depending on which tool is under scrutiny, there are either a greater or a lesser number of contexts within which to use it. The context determines whether we can use it, either by changing its components or changing the tool itself. For example, a machete can be used in a diversity of contexts, while the tractor requires a relatively flat piece of land and access to petrol, the herbicide requires a specific market economy context, and agroforestry requires patience, the transmission of traditional knowledge and new learning, and so on.

**IV. Repeat practice using a human activity as an example**

The workshop facilitator then turns the group to the analysis of human activity, which is at the core of the workshop’s objectives. In order to analyse human activity, the System Operator asks the following questions (again in the numbered order given):

**Table 24: the System Operator used for the analysis of a human activity**

<table>
<thead>
<tr>
<th>1. What are we recognizing?</th>
<th>2. Parts of the object which allow it to fulfil its function</th>
<th>3. Where does it take place?</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. The object’s parts which allowed it to fulfil its function</td>
<td>6. Where did it take place?</td>
<td>4. In the past, what human activity fulfilled the same function?</td>
</tr>
<tr>
<td>8. How will its parts will be in the future</td>
<td>7. What will the human activity be like in the future?</td>
<td>9. Where will it take place?</td>
</tr>
</tbody>
</table>
5. What were its parts in the past?
2. What are its parts now?
8. What will its parts be in the future?

PAST | PRESENT | FUTURE

Following the basic analysis using the System Operator, the facilitator then leads a problematising dialogue (p.229-30) on the topic of the human activity chosen.

**Adaptations**
The group chose to analyse, as their human activity, the production of crafts in the Reserva da Jaqueira. This analysis permitted them to link craft production with (i) the availability or absence of natural resources in the territory, (ii) the crafts’ intangible functions, and (iii) its economic role for community members.
The subsequent problematising dialogue covered issues such as: the need to control access to the territory, the community’s entitlement to the use and enjoyment natural resources, future economic opportunities for the next generation of Pataxó, and other cultural aspirations.

V. Repeat the process using a system or issue that the community is currently grappling with

If the system is an animal, a tool or a human activity, the facilitator can use the 9 windows schemes described above. If it is something else, the facilitator can use the general scheme for the System Operator is provided in Table 21 above.

For a basic analysis of the system/issue at hand, the following points and questions are used to stimulate the discussion:

- Name the system and its primary function (or activity)
- What are the current and the desired system structure (i.e. its components/parts)?
- How is the main function performed?
- What is the environment/context?
- What resources are available for the system (including natural phenomena)?

Questions regarding change are then explored:
What aspects of the system, its components and the context have changed over time? What were the driving forces behind these changes?

What aspect of the system, its components and the context stayed the same over time? What forces maintained these aspects/elements?

What is the system’s meaning/important for the world, the planet, humanity? (beyond the context set in the System Operator)

What are trends can we detect in the process of transformation of the context?

Does the system tend to adapt to these changes or transform radically?

What are the problems the system faces: are they related to the context, the characteristics of the system or its components? What are the opportunities?

The problems that face the system can be related to:

- A technical contradiction (two incompatible technologies)
- A physical contradiction (two incompatible physical qualities)
- A function that should be applied but we do not know how to do so
- A function that ought to be implemented in a different way
- Inefficient yet necessary action, that utilizes a great deal of resources
- A harmful action
- An overly complex system

Bearing in mind the potential nature of the system’s problems, the facilitator can lead a problematizing dialogue to resolve these problems. The following questions can be used to stimulate the discussion, depending on the nature of the problem the group has identified:

- What are the problems the system faces: are they related to the context, the characteristics of the system or its components? What are the opportunities?
- Who has the problem?
- What resources are involved in the problem?
- When does the problem occur? Under what circumstances?
- Where does the system occur?
- Why does the problem occur? How can we solve it?
- What are the mechanisms that prevent the achievement of our objectives related to the syste)? What helps to achieve these objectives? Provide the history.
- Can we change the system?
- What prevents the solution? (Time, money, people)
- Have there been any previous attempts at solving the problem? (Perhaps elsewhere, or perhaps similar problems)

V. Recapitulate and discuss

Once all of the examples have been thoroughly explored by the group with the facilitator’s support, the workshop concludes with a recapitulation and a discussion. The recapitulation involves the facilitator asking members of the group to lead through the 9 windows one more time, either conceptually or using another example of the group’s choice. During this process, participants may ask questions, and identify problems and
challenges. A rapporteur takes note of these questions and challenges, and following the recapitulation, the group works through each in turn. The facilitator encourages participants to answer questions and resolve problems, only stepping in if there is clearly a conceptual misunderstanding.

*Example of a work plan*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction and brief theoretical background</td>
<td>1hr, AM.</td>
</tr>
<tr>
<td>II. Practice of the SO with a living being as an example</td>
<td>1 hr, AM.</td>
</tr>
<tr>
<td>III. Repeat practice with a tool as an example</td>
<td>1 hr, AM.</td>
</tr>
<tr>
<td>IV. Repeat practice with a human activity as an example, including problematising dialogue</td>
<td>1-2 hrs, AM</td>
</tr>
<tr>
<td>V. Recapitulation and discussion</td>
<td>1-2 hrs, PM</td>
</tr>
</tbody>
</table>

*Equipment and materials*
- Flipchart
- Marker pens
- Pencils and paper for participants to take note, if necessary
Some challenges and adaptations
The first clear challenge is to adapt the tool’s presentation to an audience of adults with no formal education. It may be be that those participating in the workshop are adults or youth with some formal education; even if that is the case, we feel that it is important that all members of the community can have access to the tool (otherwise we run the risk of creating ‘elites’ who understand the tool while others do not). In order to ensure this democratic ownership of the tool, the language and approach must be such that the learners can learn how to share it with others in the community, whatever their level of formal education.

It is also important to repeat the process a sufficient number of times in order to ensure that the tool reveals its didactic potential. Our pedagogic proposal was to analyse first a plant, then an animal, a tool, a human activity, and finally a landscape. By progressively analysing increasingly complex systems, participants can learn how to use the tool more intuitively. However, it is also important to carry out repeat analyses using different plants, animals, human activities and landscapes, as repetition with variation allows participants to learn the concept of a system, and to define the characteristics of these systems. In order to carry out these repeat analyses, it is necessary to be present with the participants for prolonged periods.

As we have implemented the process, we have learned that, especially if time is short, it is convenient to share the tool with the local teachers, whether they are involved or not in the co-enquiry process. By working with teachers, our scope broadens out to a younger segment of the population, who are also in formal education, and who can contribute to the community-based research. Teachers can also benefit from the tool professionally. Once the teachers have grasped the process, they can support the didactic process and help in repeating the exercises.

We are currently working on an approach for sharing more aspects of the theoretical-methodological framework with participants, with a view to building community researchers’ capacities to use, adapt, and re-invent the tool to their own ends, as part of a full co-enquiry process.

Some lessons learned:

After having implemented a series of System Operator workshops, both in the context of COMBIOSERVE and elsewhere, GDF learned the following lessons:

• In order to teach the System Operator, the sequence is: analyse a plant, an animal, a tool, and then an activity. To analyse a plant, the same approach as the animal is taken.
• It helps to analyse the structural evolution of a being: a chick becomes a rooster.
• With the system, we can analyse the evolution of a function over time. Note that some systems, such as memory or paper, may have the same function over time.
• It is richer to analyse something we observe directly or with the assistance of a mediator object such as a map, a picture, a letter or a song. Basing the exercise on memory is not advised.
• The greater the group’s familiarity with the system/being under analysis, the more details they have to work with. In effect, experts often find it difficult to analyse a very generic system or being. For example, rather than simply analyse a ‘rooster’, it is better to analyse a ‘Polish rooster’.
• The unit of time used to analyse the past depends on the specific objectives of the research.
• The future can be imagined according to the exercise’s objectives, whether they are planning, analyzing trends, or exploring ambitions/aspirations.
VI. Evaluating co-enquiry research processes

In this section, we describe our experience of collaborative evaluation of community-based research in the Chinantla fieldsite communities. Participatory Monitoring and Evaluation (PM&E) is the term often used to discuss processes of project monitoring and assessment that actively involve community members (Gujit and Gaventa 1998; Estrella and Gaventa 1997; Blauert et al 2000). PM&E has benefited mostly from experiences and reflections in the field of development, although some scholars have also begun to publish on evaluations of community-based participatory research projects (Schulz et al 2003).

The basic principles of PM&E are (from Gujit and Gaventa 1998; Coupal 2001):

1. Participatory monitoring and evaluation should be an ongoing and central element of the implementation of any project; the PM&E process should be established with the beneficiaries of the project at its outset;
2. It is a process that requires reflection, self-reflexivity, respect, openness to change, flexibility, etc.;
3. Its object is capacity-building of beneficiaries, increased ownership of the project and multi-stakeholder accountability;
4. The process of PM&E is planned, managed and implemented by project beneficiaries (and other stakeholders), with the support of a facilitator;
5. An important focus of PM&E is indicators of project progress; these are to be designed, and used to evaluate results, by project beneficiaries;
6. The approach is adaptive, and each project will require its own framework for PM&E.

The PM&E approaches are rich in ideas and progressive approaches for engaging community members. However, for the purposes of co-enquiry in the Chinantla region, the authors of this manual chose to adopt a less structured approach than that proposed by PM&E authors. In our experience, in the Chinantla context, highly structured approaches, particularly when engaging with the entire community, are not very efficient or easily appropriated locally. If participatory evaluations are too structured, they may simply be seen as yet another ‘task’ the community is given as part of the project, rather than an empowering tool. Therefore we have often chosen to carry out blend of periodic structured evaluations with the whole community and group-based ongoing dialogue with community researchers and members.

Although there are a wide variety of methods for carrying out participatory evaluations with indigenous and local communities, the authors share the ones we have specific experience in. These are (i) the evaluation mural, (ii) the bag of surprises, (iii) evaluation cards, (iv) reach for the stars, and, last but not least (v) Freirean ‘culture circles’ and problematising dialogue.

Pre-evaluation exercise
In GDF’s experience working with community researchers in Malaysia and Mexico, we learned that what the funders wish to see in an evaluation differs from what the
community considers important to evaluate. Similarly, that which the external support
team thinks it is important to evaluate may be different to that which the community
wish to see evaluated. Nevertheless, it is important to accept that the work teams and the
community have limited time and energy and it is difficult to carry out an evaluation that
includes all interests. Therefore, GDF staff designed a pre-evaluation exercise for the
community in order to find a consensus on what the expectations of the evaluation are.

This exercise is carried out in a number of steps with a small group form the community,
usually the community research team and any other individual who has been involved in
the activities, including community authorities. One can use the exercise of ‘concerns
and expectations’ (see below) in order to help participants understand what will be
evaluated and why. The objective of the exercise is to identify as broadly as possible the
project themes that the whole community wishes to evaluate in depth. The small group
can carry out subsequent meetings with other members of the community in order to
ensure the themes are appropriate. Finally, a larger workshop with the whole community
is held.

**Step 1**
During the first evaluation meeting with the small group, the following questions are
explored:

- What are the aspects of the project that we would like to evaluate with the whole
  community? These can be, for example:
  - The collaboration agreement
  - Activities carried out with the community
  - Results of the research to date
  - Community participation
  - Participation, role and approach of GDF and the community researchers

- What kind of feedback would we like to obtain from this evaluation? The
  questions that the group develop, could include:
  - Does the community understand what the project is about?
  - How satisfied are the members of the community with the project so far?
  - What do the community members think the strengths and the weaknesses
    of the project are to date?
  - In what way do community members think that the project can improve
    in the future, and what are our future challenges?

- What kind of evaluation activities can we use to obtain this feedback? The
  proposals developed may include:
  - A community workshop open to all the members of the community
    (How many workshops are necessary? How large would each workshop
    be?)
  - Other techniques like interviews
  - Combining methods – a community workshop, a questionnaire, and
    interviews with key informants (How much time is necessary to apply
    these methods? Could a combination of methods yield repetitive
    information and result informant fatigue?)

- Who should be present in the evaluation activities?
• When can the evaluation activities be carried out?
• What must we do to prepare, develop and document the evaluation activities? Who will be responsible for each task?
• What will these activities cost?

**Step 2.** Based on the answers given and the small group dialogue, agreements are reached regarding what will be done, the tasks to be fulfilled and the division of responsibilities. The planning of subsequent meetings with other members of the community to ensure the themes are appropriate and encourage wide participation in the evaluation activities.

**Step 3.** Subsequent meetings with other members of the community to ensure the themes are appropriate.

**Step 4.** Community evaluation workshop, designed during Steps 1, 2, and 3.

**The concerns and expectations exercise**
This exercise has as an objective to reflect on any concerns that emerged during the course of the co-enquiry process, and that the group wishes to explore during the evaluation workshop with the whole community, and to verify if they still exist. It also seeks to explore if and how expectations in the community have changed over the course of the research process. The technique used is a simple answer of ‘agree’ or ‘disagree’ with regard to the statements given. In the example given for an evaluation activity with Chinanteco community researchers, the concerns and expectations were as follows:

**Concerns**
• Not being able to answer the question
• Not being able to adapt to participatory techniques
• Not learning participatory techniques
• Not being able to apply the techniques to the themes
• Not being able to get involved effectively
• Not having time to participation
• That my ideas may not be respected
• That the workshops and learning will not work and I will be as I was before
• That I will not be motivated to change methods (to a co-enquiry approach)
• Fear of losing authority
• Fear of losing competence and lack of coordination with my colleagues
• Fear of not being able to use the methods appropriately
• Fear of being questioned by the community
• Fear that we will not be able to do what we say we will do

**Expectations**
• That the techniques contribute effectively to facilitate community research
• That we can recognize our shortcomings and that we receive support to be better researchers and colleagues
• To learn to be motivated for participatory techniques
• To get to know each other better to deal with our differences
• To be able to apply what we learn creatively
• To get to know our colleagues in different ways
• That the work and workshops take place in a relaxed way
• That we can give and receive experiences
• That we learn the methods by practicing them
• To discover the need to change values
• To achieve good communication and open participation among community members
• That the methods simply and render more productive our learning process

The evaluation mural

This method can be used to evaluate project participant’s general feelings about their participation in the co-enquiry research process. It involves drawing or printing the following table in a large enough poster format to carry out a collective activity. The mural is pinned to the wall for all to see. If all participants are able to read, the coordinator invites everyone to stick small stickers on the cell that they feel most in agreement with. If there are participants who cannot read, the coordinator reads the content of the poster and asks the participants to give a show of hands when they agree with a response. These responses are taken note of on the mural. The mural given here is an example, taken from an evaluation of community researchers’ experiences as part of a co-enquiry research team.

<table>
<thead>
<tr>
<th>During my work as a community researcher…</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>😄😄 Strongly agree 😄 Agree 😄 Disagree 😄 Strongly disagree</td>
</tr>
<tr>
<td>... I listened to my colleagues</td>
<td>😄😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td>... I expressed my opinion</td>
<td>😄😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td>... I made suggestions</td>
<td>😄😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td>... my suggestions were reflected in the results</td>
<td>😄😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td>... I learned new skills</td>
<td>😄😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td>... the information generated will be useful to my community</td>
<td>😄😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td>... the way we worked as a team was appropriate</td>
<td>😄😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
<tr>
<td></td>
<td>😄</td>
</tr>
</tbody>
</table>

19 This technique was contributed by Isabel Ruiz Mallén from UAB
The bag of surprises
This method can be used to evaluate activities carried out by groups in the community, e.g. the community researchers. Firstly, evaluation questions are prepared and written each on a piece of paper; all the questions are placed inside a bag. In a session with the whole community (or research team, depending on the scale of the evaluation), each person takes a question and answers it immediately. The rest of the group is then given the time to comment on the answer, while a designated person takes notes of the results of the evaluation.

The questions can be broad or defined. It is suggested that a few funny/fun questions be inserted in order to make the evaluation more entertaining. It is important to adapt the language and content of the questions to suit local perspectives and understandings. In the example relating to community researchers’ perspectives on their co-enquiry experience, the authors used the following questions (although it is highly recommended every co-enquiry process develop their own tailored questions):

- What did you like best about the work you participated in?
- What did you like the least about the work you participated in?
- What were the problems or obstacles you encountered in the work?
- Were all the tasks proposed completed?
- Were you motivated by the activities proposed?
- What can the community researchers do to make the work more satisfactory?
- In what way has the experience served you personally?
- What do you think the opinions of the elders [relatives/authorities/youth and children] are regarding the work?
- Imitate an animal
- Share a joke

The authors also used this technique to evaluate the relationship between GDF and the community researchers, asking questions such as “Why do you think GDF is interested in carrying out work with community researchers?” “What aspect of GDF’s process did you feel most/least comfortable with?”, and “What can GDF do to make this kind of work more satisfactory to community researchers and the community as a whole?”.

20 The term ‘work’ is used here as that is how Chinantec community researchers refer to their participation in co-enquiry. However, as mentioned, the language and concepts used in the questions must be adapted to local circumstances and worldviews.
**Evaluation cards**
This method can be used to exhaustively gather and discuss a group’s opinions on a number of different themes. Each participant receives a series of coloured cards (one colour per theme or activity being evaluated). Each of the cards shows a question to which the individuals must answer. The authors used this approach to evaluate the community researchers’ perspectives on the relationship between the co-enquiry process and the community at large. However, this method is ideal for any group who can read and write. The following questions were used:

- How as the community integrated into the research process’
- What kind of information was collected?
- Who is missing from the interviews?
- Who (in the community) knows of the work that is being carried out?
- Who else ought to know about this work?
- How can we present our work to the community?
- Who does this work serve?
- What is this work useful for?

The coloured cards, upon which answers have been written, are then collected and collated by colour, and answers are discussed in a plenary session.

**Reach the stars**
This method can be used to evaluate learning among community researchers and members. Prior to starting the process, the facilitator prepares 20-30 evaluation questions. Pinned to a wall or a blackboard are 20-30 cardboard or paper stars with a number written on the back. After the formation of a number of groups, one participant from each group picks a star and reads out the number. The facilitator reads the question that is associated with the number, and the person who picked that star answers the question with the help of his/her group. If they answered correctly, they keep the star; if not, the facilitator replaces the star with the others. Those with the most stars “win” the game.

**Freirean culture circles and problematising dialogue**
As described above, in Chapter III, ‘culture circles’ were a method developed by Paulo Freire to support groups in the use of dialogue for resolving their problems. In the space of a culture circle, members of the group sit together in a circle and dialogue freely: both words and silences are permitted, and both must be engaged with critically. Culture circles can also be carried out through walking or hiking dialogues that conclude with a sit-down circle. In the context of evaluating co-enquiry research processes, culture circles are an ideal format to use as an ongoing or regular process of evaluation, for example weekly or monthly.

Although the group should feel free to implement their own version of the culture circle, it usually follows the steps: enunciating generative themes, problematising dialogue, problem-solving, and action at a personal or societal level. Generative themes are key ideas, words or phrases that represent issues the group or community is contending with at that point in time. In the context of evaluation, these generative themes can be broadly
related the process of co-enquiry and community integration in the process, or more specifically related to how the community researchers are coping with their role and responsibilities.

GDF has used culture circles and problematising dialogue effectively in the context of a community research team that was negotiating some challenges regarding its position within the community. In order to implement these “co-relief” sessions the first step was to allow all of the members of the team to share those aspects of their work in the community research team that were causing anxiety, tension, anger or sadness. During this step every one listens to the speaker without making comments. All of these issues, and the emotions they provoke, are written on a flipchart. The second step is to examine the issues and associated emotions arising and to ask whether anyone else has anything to add – regarding how they felt – to the issues and events mentioned. The third step is to choose one particular event, issue or emotion that affects all of the community researchers upon which to carry out a ‘problematising dialogue’.

Problematising dialogue, as mentioned in Chapter III, involves identifying, problematising and deconstructing issues that are important in the lives of the participants. This is a process whereby all of the assumptions of the participants regarding the generative themes are opened up for scrutiny and discussion. In the context of an evaluation of the research process, any insecurities with regard to the project progress or problems the community research team may be feeling with regard to the rest of the community can be aired and examined through gentle dialogue. The problematising dialogue can be complemented with a systemic analysis of the issue (see above, the CRP on Innovative approaches), with a view to solving any problems arising. The outcome of the problematising dialogue for evaluation is a group or a community who has carried out an in-depth and critical reflection on the research project and process, and found solutions to problems they encounter. It is very effective to repeat the process regularly, because through dialogue, new generative themes and problems are revealed.

Although the culture circle is often a technique proposed by the facilitation team, the community may also have its own systems for profound collective reflection, and these should be integrated into the evaluation process as much as possible. Sometimes community members already have experiences with Freirean culture circles, in which case the process can be built using their knowledge and perspectives.

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21 In the Chinantla, these sessions were called ‘co-alivio’ or ‘co-relief’ sessions as they involved community researchers providing support to each other by providing a space for open sharing of concerns and worries, and listening to each other.
VII. Disseminating the results of co-enquiry research

In this chapter, we present ideas for participatory dissemination of project results.

Participatory video

Participatory video has been around for almost 50 years. Its basic premise is that communities can make their own videos for advocacy, learning, communicating and sharing stories. Video making is relatively easy to learn and accessible to people with no formal education. Participatory video forms a core element of communication and dissemination in COMBIOSERVE. The fieldsite communities and CSOs have made a diversity of project-related videos, including videos of the project workshops, exploring their participation in the project, and about community issues. The fieldsite communities also communicated amongst themselves using video letters: these are short videos in which community members, usually community researchers, discuss the results of their research and issues they are facing in the community. Rather than repeat the excellent work of participatory video specialists (see the Resources section), in this manual we will concentrate on the more innovative use of video letters in the COMBIOSERVE project.

COMBIOSERVE experiences with video letters

The video letter format works as follows: community researchers from one site send an initial video letter: these are watched and critically discussed by other teams who then respond with their own video letter. These videos are usually no more than 5-10 minutes long, and presented by one or at most two individuals speaking to the camera. In the COMBIOSERVE experience, the community researchers from all field sites appropriated the process, choosing to speak their own languages (with subtitles) and to discuss either the progress of their research or local issues they were facing.

Voices from the communities: video letters

During the final COMBIOSERVE conference, Community Conservation in Latin America: innovations in research and methods, held in Xico, Veracruz, Mexico from 6-9 November 2014, two community researcher dialogues were held during which video letters were discussed. Presented here are some of the conclusions drawn.

Video letters were highlighted, by community researchers, as ways of getting to know other communities’ realities and ways of life. It is empowering for them to know that other communities far away are facing similar issues and engaging in similar struggles to protect their biocultural heritage and maintain their livelihoods. Furthermore, community researchers from Calakmul suggest that video letters can have practical outcomes, for example by sharing techniques and ideas for pursuing research as well as for dealing with everyday problems, such as domestic animal illnesses. Community researchers also deemed the video letters a useful format for disseminating their research efforts and results to the broader public. The community video

teams noted that discipline and facilitators’ support are necessary for the video letter format to work as a mode of communication between far-flung communities.

Community researchers from different field sites agreed that it is important that these videos are used cautiously and respectfully, and that if any sacred or secret knowledge is exposed that they should not be made public. Nevertheless, it may be important to record this knowledge for future generations. In this case, there must be clear and stated embargoes on who can see the videos, and how they are shared. Simultaneously, important knowledge can be shared and passed on within the community, for example in community schools, by using the video letter format.

The following webpage collates all of the video letters produced as part of COMBIOSERVE: http://www.combioserve.org/en/video/letters

Publications

A foundational rule of co-enquiry is that the data and results of the research belong to the community as a whole. Therefore, the decision to disseminate the results of the research beyond the community involved must be made by the community members themselves in accordance with customary decision-making procedures.

Voices from the communities: publishing our research

During the community researchers’ dialogue held at the COMBIOSERVE conference (see previous page), community researchers from different countries mentioned the importance of being in control of the publication of results. This does not only mean having decision-making power regarding what the academics they have been working with publish, but also being in charge of publishing the data they are collecting. While they concede that they need support from friendly researchers and/or facilitators to continue the research and to develop their publications, some insist that they would like to begin publishing their research in the community’s name and being in control of that which is being published. Conversely, in some cases communities do not wish to be named as authors on publications in which they have participated, due to the possible political repercussions of the publication.

If the community wishes to disseminate the results to outside audiences, they must decide which audiences they wish to reach, what they want to tell them, and how they want to present the results. All of these decisions must be made by consensus and through processes of reflection that give community members the time to reflect on the possible consequences of sharing or withholding the results.

If the community decides to publish research results on paper, it is likely that the facilitation team will be responsible for securing an appropriate outlet for the publication and for helping to produce the publication. The community at large will give final validation to any article prior to its publication. Ideally all the members of the research team involved would share the authorship of the article, although in some cases the community may wish to either be the sole authors or not appear at all on the list of authors. All of the decision-making processes regarding publication are to be carried out with full community participation so as to ensure maximum transparency and to avoid the possibility of conflict once results are published.
From the outset, the community assembly (or other decision-making body) formally decides what information will be available to the external institution for publication and how it will be used. In the event that the community does not want to make a decision on the results at the outset of the project, an early agreement should nevertheless be made in order to establish that the FPIC process determines the use of results at the end of the project. Moreover, community members have the right to change their minds as the research progresses and flexibility must be built into the original agreement: it may be that at the outset of the project, the decision-making body agreed to allow all results to be publishable, and yet decides, upon conclusion of the research, that it would not be appropriate for some or all of the results to be in the public domain. However, in some communities, the consequences of placing information in the public sphere might not be known: it is the duty of the facilitation team to share and facilitate a community debate on the possible negative and positive consequences of publishing research results.

If there are conflicts within the community regarding how to use results, the facilitation team cannot be expected to take a mediating role, although they may request the opportunity to share their perspective during the community-led debate and decision-making process. As mentioned above, it is the duty of the facilitation team to explain what the implications of their use of the information may be for the community, and to respond to any doubts or queries the community members may have. Above all, respect for the communities’ FPIC processes will guide the facilitation team in the event that a situation of conflict arises.
VIII. Co-enquiry, emancipation and advocacy

One of the principal ambitions of co-enquiry is to contribute to social justice. Rooted in the goal to decolonise research practice, co-enquiry’s ultimate aim is self-determination, empowerment and autonomy of the communities leading the research (see Smith 1999). While these are lofty ambitions to strive for in the long term, most co-enquiry processes often attain more modest social justice goals in the short term.

Given that the research products of co-enquiry are developed to respond to community needs, communities and their supporters can use these to advocate before internal and external institutions to various ends. Publications, videos, and other products can be deployed externally, for example with political actors, to mobilise for changes demanded by the communities, or to support legal cases. They can be used internally to revitalise cultural expressions, engage community members in reflections about their decision-making and futures, or implement activities to ameliorate community livelihoods. In belonging to the community, the knowledge generated by the co-enquiry research can be stored and repurposed for use the future.

Another way in which co-enquiry processes contribute to social justice is by disseminating the use of the process itself, contributing to the development of new knowledge and ideas for implementing collaborative research, growing the network of practitioners of co-enquiry, and expanding the demand for such research to be funded across the board. In particular, engaging with indigenous approaches to research can bring about radical new learning for academics (see Ideas box p.17-8). Bringing the two foundations of indigenous thought – relationality (i.e. that every being, including researchers, is constituted by its relations) and accountability to these relationships (Wilson 2008) – into everyday conventional scientific practice has the potential to transform it as well as the institutions housing it. Developing, enhancing and deploying co-enquiry processes wherever possible in scientific research may prompt academics, even those thoroughly rooted in conventional research approaches, to embody these grounding and respectful perspectives into their practice.

For the transformative potential of co-enquiry to be fulfilled, researchers are consciously active and engaged in the social, environmental and political issues faced by the communities they collaborative with. They are committed to ‘staying the course’ with the communities they are engaged with despite the local or academic dynamics they encounter. They are required not only to adopt a critical perspective on positivist approaches to research with communities, but, some would argue, establish a position of resistance as well (Ristock and Pennell 1996; Smith 1999; Brown and Strega 2005). They must be at ease with the knowledge that they will occasionally, or even regularly, be placed in uncomfortable positions as they straddle different worldviews, ideologies and institutions. They must be prepared to learn about themselves, even when what they might uncover is unexpected or dismaying. They will also discover the deep joy and satisfaction of taking emancipation – theirs included – as their principal working objective.
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Resources

Co-enquiry
One of the most recent initiatives in the development of the co-enquiry approach is the Beacon North East (www.beaconnortheast.org) project led by Newcastle University in partnership with Durham University and the Centre for Life in the UK. Beacon North East was one of six UK Beacons for Public Engagement, and part of a four-year initiative designed to create a culture change across the higher education sector. The Beacons were university-based partnerships that sought to support, recognise, reward and build capacity for public engagement. The project, which resulted in a series of case studies, papers, and a short toolkit for co-enquiry, is targeted at UK universities working with local communities.

The websites of Peter Reason (www.peterreason.eu) and John Heron (www.human-inquiry.org) are excellent primary sources of information on co-enquiry.

John Heron’s annotated bibliography (www.human-inquiry.com/doculist.htm) provides a particularly rich list of documents and downloadable files. Peter Reason also provides an extensive list of downloadable publications (www.peterreason.eu/Papers_list).

The website of the Durham Community Research Team, Centre for Social Justice and Community Action, Durham University, who have pioneered research on the co-enquiry approach (www.dur.ac.uk/beacon/socialjustice/)

Ethics in participatory research
Lancaster University web resource for Social science research ethics: www.lancs.ac.uk/researchethics/ which includes a comprehensive section on participatory research: www.lancs.ac.uk/researchethics/5-1-Intro.html as well as a good starting bibliography: www.lancs.ac.uk/researchethics/5-8-biblio.html

Durham Community Research Team, Centre for Social Justice and Community Action, Durham University: www.dur.ac.uk/beacon/socialjustice/ethics_consultation/
The DCRT has also produced a comprehensive guide on ethical issues, downloadable at www.dur.ac.uk/resources/beacon/CCDiscussionPapertemplateCBPRAhinket neoliberal7Nov2011.pdf

Paulo Freire
There are various Paulo Freire Institutes around the world, each with their own website:

- **USA (UCLA)**: [www.paulofreireinstitute.org](http://www.paulofreireinstitute.org)
- **Brazil**: [www.paulofreire.org](http://www.paulofreire.org)
- **The Freire Project (International)**: [freireproject.org](http://freireproject.org)
Participatory video
Insight Share ([http://insightshare.org](http://insightshare.org)) is one of the core organisations promoting and supporting participatory video around the world. They published a comprehensive handbook: [http://insightshare.org/resources/pv-handbook](http://insightshare.org/resources/pv-handbook)


In 2007, the Institute of Development Studies of University of Sussex published a compendium of resources for participatory video: [http://www.ids.ac.uk/files/Resources_on_PV.pdf](http://www.ids.ac.uk/files/Resources_on_PV.pdf)

In 2011, the organization Mother Child Health and Education Trust designed a toolkit entitled Community Video for Social Change that can be downloaded from their website [http://www.communityvideo.in/](http://www.communityvideo.in/)
Annexes

Annex 1: International Institute for Environment and Development 15 Ethical Principles for collaborative research

These principles are considered by the IIED to constitute the basic assumptions underlying the Code of Ethics of the International Society for Ethnobiology (see Annex 2), and as such provide an excellent grounding for ethics in collaborative research

1. Principle of Prior Rights This principle recognises that indigenous peoples, traditional societies, and local communities have prior, proprietary rights and interests over all air, land, and waterways, and the natural resources within them that these peoples have traditionally inhabited or used, together with all knowledge and intellectual property and traditional resource rights associated with such resources and their use.

2. Principle of Self-Determination This principle recognises that indigenous peoples, traditional societies and local communities have a right to self determination (or local determination for traditional and local communities) and that researchers and associated organisations will acknowledge and respect such rights in their dealings with these peoples and their communities.

3. Principle of Inalienability This principle recognises the inalienable rights of indigenous peoples, traditional societies and local communities in relation to their traditional territories and the natural resources within them and associated traditional knowledge. These rights are collective by nature but can include individual rights. It shall be for indigenous peoples, traditional societies and local communities to determine for themselves the nature and scope of their respective resource rights regimes.

4. Principle of Traditional Guardianship This principle recognises the holistic interconnectedness of humanity with the ecosystems of our Sacred Earth and the obligation and responsibility of indigenous peoples, traditional societies and local communities to preserve and maintain their role as traditional guardians of these ecosystems through the maintenance of their cultures, mythologies, spiritual beliefs and customary practices.

5. Principle of Active Participation This principle recognises the crucial importance of indigenous peoples, traditional societies and local communities to actively participate in all phases of the project from inception to completion, as well as in application of research results.

6. Principle of Full Disclosure This principle recognises that indigenous peoples, traditional societies and local communities are entitled to be fully informed about the nature, scope and ultimate purpose of the proposed research (including methodology, data collection, and the dissemination and application of results). This information is to be given in a manner that takes into consideration and actively engages with the body of knowledge and cultural preferences of these peoples and communities.

7. Principle of Prior Informed Consent and Veto This principle recognises that the prior informed consent of all peoples and their communities must be obtained before any research is undertaken. Indigenous peoples, traditional societies and local communities have the right to veto any programme, project, or study that affects them. Providing prior informed consent presumes that all potentially affected communities will be provided complete information.
regarding the purpose and nature of the research activities and the probable results, including all reasonably foreseeable benefits and risks of harm (be they tangible or intangible) to the affected communities.

8. **Principle of Confidentiality** This principle recognises that indigenous peoples, traditional societies and local communities, at their sole discretion, have the right to exclude from publication and/or to have kept confidential any information concerning their culture, traditions, mythologies or spiritual beliefs. Furthermore, such confidentiality shall be guaranteed by researchers and other potential users. Indigenous and traditional peoples also have the right to privacy and anonymity.

9. **Principle of Respect** This principle recognises the necessity for researchers to respect the integrity, morality and spirituality of the culture, traditions and relationships of indigenous peoples, traditional societies, and local communities with their worlds, and to avoid the imposition of external conceptions and standards.

10. **Principle of Active Protection** This principle recognises the importance of researchers taking active measures to protect and to enhance the relationships of indigenous peoples, traditional societies and local communities with their environment and thereby promote the maintenance of cultural and biological diversity.

11. **Principle of Precaution** This principle acknowledges the complexity of interactions between cultural and biological communities, and thus the inherent uncertainty of effects due to ethnobiological and other research. The Precautionary Principle advocates taking proactive, anticipatory action to identify and to prevent biological or cultural harms resulting from research activities or outcomes, even if cause-and-effect relationships have not yet been scientifically proven. The prediction and assessment of such biological and cultural harms must include local criteria and indicators, thus must fully involve indigenous peoples, traditional societies, and local communities.

12. **Principle of Compensation and Equitable Sharing** This principle recognises that indigenous peoples, traditional societies, and local communities must be fairly and adequately compensated for their contribution to ethnobiological research activities and outcomes involving their knowledge.

13. **Principle of Supporting Indigenous Research** This principle recognises, supports and prioritises the efforts of indigenous peoples, traditional societies, and local communities in undertaking their own research and publications and in utilising their own collections and data bases.

14. **Principle of The Dynamic Interactive Cycle** This principle holds that research activities should not be initiated unless there is reasonable assurance that all stages of the project can be completed from (a) preparation and evaluation, to (b) full implementation, to (c) evaluation, dissemination and return of results to the communities, to (d) training and education as an integral part of the project, including practical application of results. Thus, all projects must be seen as cycles of continuous and on-going dialogue.

15. **Principle of Restitution** This principle recognises that every effort will be made to avoid any adverse consequences to indigenous peoples, traditional societies, and local communities from research activities and outcomes and that, should any such adverse consequence occur, appropriate restitution shall be made.
Annex 2: Code of Ethics of the International Society for Ethnobiology

The Code of Ethics of the International Society for Ethnobiology (ISE) can be downloaded from the ISE's website: http://ethnobiology.net/code-of-ethics/ in several languages, and is in a constant process of amelioration. All social sciences and natural sciences researchers, whether they use qualitative or quantitative approaches, are encouraged to adhere to these standards as they were co-drafted with members of communities that have historical experience of “being researched.” This process of co-development helps ensure that by properly using the ISE Code of Ethics, the perspective of such communities frames research activities. Nevertheless, the ISE Code of Ethics represents a basic standard, and researchers are encouraged to go beyond it. One way to do so is to collaborate with communities in a process of co-production of knowledge that serves the communities’ needs and aspirations above those of the researcher (see below).

The fundamental value underlying the ISE's Code of Ethics is the concept of mindfulness, which signifies “a continual willingness to evaluate one's own understandings, actions, and responsibilities to others.” This value reflects the recent transformations in ethnographic practice, discussed above, which require the researcher to be highly self-reflexive, flexible and politically engaged. Beyond mindfulness, the most important principles of any ethnography research are the following (these points summarise and expand on some of the principles of the ISE CoE):

1. **Recognition of rights:** This includes communities' and peoples' inalienable rights to their territories and resources, to self-determination, to their customary laws and practices, to the protection of their cultural and spiritual values, to their intellectual property and associated biological and genetic resources, and to respect as knowledge-holders and land-owners. Communities are therefore the ultimate decision-makers regarding any research carried out on their lands or among their people, and their own modes of decision-making must be respected at all times.

2. **Free, prior and informed consent:** Prior to starting any research activity, communities that are likely to be involved must be fully informed of the activities proposed and have the right to refuse the proposed activity. Should they accept the proposed research, they have the right to be involved in decision-making throughout the research cycle, and they must be active participants in any research programme.

3. **Active participation, and beyond:** People involved in the research should not only be active participants in any research activity carried out in their lands and communities (in its design, implementation and analysis), but ideally should be key actors in the development of research ideas. Researchers should prioritise the research needs and ideas of the communities they seek to work with, and to transform their role from leaders of research programmes, to advisors or facilitators for community-led research programmes.

4. **Trust and disclosure:** The communities participating in the research must fully understand the ultimate goal of the research and how it will be used, therefore the latter must be presented in ways that community members can understand and transmit
information among themselves. Much like with Free, Prior and Informed Consent, researchers must discuss any change in the research, how data is being analysed, used and presented throughout the project cycle, and community members have the right to disagree, request changes throughout the process, or even call a halt to it in extreme circumstances.

5. **Privacy, confidentiality, and anonymity:** In the context of ethnography, these elements are particularly important. Researchers must always be mindful of issues of individual privacy in the context of the group: e.g. they should never report people’s interview responses without the latter’s specific consent. They must also always respect group confidentiality, which means that communities have the ultimate say regarding what information can be published or not. When publishing articles, books or reports, researchers must respect individuals’ and communities’ rights to remain anonymous, and if necessary, must create pseudonyms or writing styles that protect people’s and communities’ identities.

6. **Reciprocity, equitable benefit-sharing, and active support:** Social researchers increasingly seek to go beyond the ‘do no harm’ principle, aiming instead for positive and useful outcomes for their research among the communities they work with. Any benefits from the research must be properly shared, and decisions for so doing must be taken in a way that respects community decision-making processes. While always acknowledging the support and participation of community members in research processes, researchers must find ways of ensuring that they give something back to the communities and individuals they have worked with, in a form chosen by community members according to their customary decision-making processes.
Annex 3: Dictionary of useful terms in participatory research and co-enquiry

Co-enquiry: Short term for 'collaborative enquiry', 'cooperative enquiry' or 'collaborative research'. Research 'with' rather than 'on' people”; it emphasizes that all active participants are fully involved in research decisions and actions as co-researchers. Research decisions and actions range from research design, defining the methods and topics of research, to data collection and the analysis and write-up of the results.

Community-based research (community research): Research activities based in the community, where co-enquiry is taken to the community level. Community participation in research decisions and actions is based on customary decision-making and takes place through elected community researchers. The whole community also participates in the analysis and revision of the research results.

Community-based researchers (community researchers): Members of a given community that are trained to be researchers. This training can be as basic or complex as the external team and the community decide it to be: it generally involves basic elements of research such as definition of the problem, definition of research methods, data collection and data analysis. Community researchers also have decision-making power, which is framed by the decision-making processes of their community –in this sense, their role is different to that of community technicians (see below).

Community research manuals (CRP): Step by step guidelines that define how to implement specific research methods in a co-enquiry process with a community.

Community technicians: Members of a given community that are trained in one or several techniques for data collection and that can be hired by external teams to conduct specific data collection work. They are not necessarily trained to conduct whole research processes, do not necessarily need to conduct their work within a co-enquiry framework, and don't usually have much decision making power. They are sometimes also called ‘paraecologists’, ‘parataxonomists’, etc.

Interactive methods: These are anthropological research methods that require longterm engagement, dialogue and interaction with communities in order to reach answers to the research questions posed. These methods cannot be rushed because they depend on trust and personal relationships to develop between researcher and community. They are also habitually infused with mutual learning (see below), and are often (although not always) highly participatory in their nature as their implementation rests on constant dialogue.

Mutual learning: This is a process that encourages peer-to-peer learning, removing the concept of a teaching-student or trainer-participant hierarchy. A relationship of equality between peers is essential for mutual learning.

Participatory methods: Methods that imply the active participation of all the subjects of research. ‘Participation’ is a broad term, and it can be used to cover a large range of levels of community involvement (see Annex 4). The methods can range from questionnaires, open
interviews or workshops that require the presence of local people, to data collection methods that involve community technicians, to data analysis methods that involve the participation and decisions of local people.

**Participatory research:** Research activities and methods that involve the active participation of all the subjects of research. (Again, ‘participation’ is a broad term, and it can be used to cover a large range of levels of community involvement.) The participation of local actors can range from *participation in information giving*, where they simply answer questionnaires and interview questions, or are present in a workshop, to *functional participation* for example community technicians are involved in collecting data, to *interactive participation/self-mobilisation* where the community is engaged in, or even launches autonomously, the whole research process (i.e. decision of the research topics and methods, data collection, data analysis). The latter panorama corresponds to a co-enquiry process.
Annex 4: Typologies of Participatory Research (adapted from Pimbert and Pretty 1995)

<table>
<thead>
<tr>
<th>Typology</th>
<th>Components of each type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive Participation</td>
<td>People participate by being told what is going to happen or has already happened. It is unilateral announcement by an administration or project management without any listening to people's responses. The information being shared belongs only to external professionals.</td>
</tr>
<tr>
<td>Participation in information</td>
<td>People participate by answering questions posed by extractive researchers and project managers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research or project design are neither shared nor checked for accuracy.</td>
</tr>
<tr>
<td>Giving</td>
<td></td>
</tr>
<tr>
<td>Participation by consultation</td>
<td>People participate by being consulted, and external agents listen to views. These external agents define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making and professionals are under no obligation to take on board peoples' views.</td>
</tr>
<tr>
<td>Participation for material</td>
<td>People participate by providing resources, for example labour, in return for food, cash or other material incentives. Much in-situ research and bioprospecting falls in this category, as rural people provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.</td>
</tr>
<tr>
<td>Incentives</td>
<td></td>
</tr>
<tr>
<td>Functional participation</td>
<td>People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organization. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.</td>
</tr>
<tr>
<td>Interactive participation</td>
<td>People participate in joint analysis, which leads to action plans and the formation of new local groups or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes. These groups take control over local decisions, and so people have a stake in maintaining structures or practices.</td>
</tr>
<tr>
<td>Self-mobilisation</td>
<td>People participate by taking initiatives independent of external institutions to change systems. Such self-initiated mobilization and collective action may of may not challenge existing inequitable distributions of wealth and power.</td>
</tr>
</tbody>
</table>
Annex 5: The Gentry method for the study of woody plants in plant communities

**Objetivos:** Determinar la riqueza de especies de plantas leñosas y suministrar información de la estructura de la vegetación.

**Método:** Este método consiste en censar, en transectos de 0.01 ha, todas los individuos cuyo tallo tenga un diámetro al nivel del pecho mayor o igual a 1 cm o bien una circunferencia a la altura del pecho mayor o igual a 3 cm.

**Procedimiento:**

1. Elegir 18 acahuales los cuales se medirán a lo largo de 9 meses, 2 acahuales por mes. Estos acahuales deben estar distribuidos uniformemente en distintas edades de descanso.
2. En cada acahual realizar 4 transectos ubicados al azar.
3. Cada transecto tendrá la medida de 100 m², con 25 m de largo por 4 de ancho y se debe orientar de forma paralela a la pendiente.
4. La distancia entre transectos será de un máximo de 20 metros.
5. Cada transecto de 25x4 m se traza con una cuerda y con cuerdas o varas perpendiculares de 2 m se establece la distancia a cada lado de la cuerda.
6. La cuerda para cada transecto se amarra a un árbol, el cual se incluye dentro de los registros.
7. En cada área de muestreo se censan y colectan todos los individuos leñosos cuya Circunferencia al Altura del Pecho (CAP) sea mayor o igual a 3 cm. La altura del pecho se considera a 1.3 m sobre el nivel de las raíces.
8. La información de cada individuo debe incorporarse al formato de registro de datos en campo y estos se van numerando de forma consecutiva.
9. Se deberán colectar todas las especies distintas identificadas en campo (morfoespecies). Cuando se colecta un individuo dentro de un transecto, se debe guardar en una bolsa separada y marcarla con una etiqueta adhesiva o cinta masking tape, indicando el número del transecto y el número de secuencia de registro dentro del transecto, por ejemplo: T3-47, quiere decir que es el individuo 47 del transecto 3. Posteriormente a esta muestra se le asigna un número de colección, se prensa y se procesa hasta constituir un ejemplar de herbario.
10. Una vez finalizada la fase de campo, todo el material se llevará a la comunidad para trabajar con expertos locales y ayudar a identificar etnoespecies.
11. Finalmente el material se prensa y se genera una lista de las especies o morfoespecies registradas en los muestreos con base en las colecciones realizadas.

**References**

Annex 6: The method for Rubiaceae, Melastomataceae and Asteraceae families

**Objetivos:** Determinar la diversidad de especies de las familias Melastomataceae, Rubiaceae y Asteraceae como grupos representativos e indicadores para estudiar la distribución de especies en general en ecosistemas tropicales.

**Método:** El método consiste en colectar y registrar todas las especies de Rubiaceae y Melastomataceae en un área de 0.4 ha por cada sitio de muestreo. Para esto, se realizan 10 transectos de 80x5 m, cada uno de ellos subdividido en 16 parcelas de 5x5 m. En total se obtienen 160 parcelas de 5x5 m, donde se determina la presencia de las especies de estas dos familias.

Para evitar la sobrecarga de trabajo a los equipos de investigación locales, este método se adaptará a los transectos realizados para el método Gentry. Al mismo tiempo se añadirá el estudio de la familia Asteraceae.

**Procedimiento:**
1. En los mismos transectos en los cuales se desarrolla el método Gentry se generarán parcelas de 20 m², con 5 metros de largo y 4 metros de ancho.
2. La cuerda se marcará cada 5 metros y en cada marca se utilizarán cuerdas o varas perpendiculares de 2 m.
3. Luego de ello, se procede a realizar colecciones botánicas (ver cuadro de atributos) de las especies de Rubiaceae, Melastomataceae y Asteraceae en cada una de las parcelas (5x4 m) por separado. Para esto es útil dividirse en dos grupos de trabajo, cada uno ubicado a cada lado de la cuerda.
4. Las colecciones botánicas se ponen en una bolsa marcada con cinta o una etiqueta con el número del transecto y el número de la parcela: por ejemplo T1-1 (esto quiere decir parcela 1 del transecto 1). Dado que un transecto tiene 5 parcelas, al final debe haber igual número de bolsas, cada una marcada desde T1-1 hasta T1-5.
5. La información de cada individuo debe incorporarse al formato de registro de datos en campo y estos se van numerando de forma consecutiva.
6. Una vez finalizada la fase de campo, todo el material se llevará a la comunidad para trabajar con expertos locales y ayudar a identificar etnoespecies.
7. La explicación clara del método, permite dar a los participantes el fundamento del método, y la preparación para organizarse en el trabajo de campo.
8. Finalmente el material se prensa y se genera una lista de las especies o morfoespecies registradas en los muestreos con base en las colecciones realizadas.

**References:**
Annex 7: Pile sorting method

Adapted from Martin (1995).

Objective: To elicit the local classification of a particular cultural domain.

Method: This method allows to order a group of objects or living beings according to their similarity. Data is presented in a way that can be registered in a matrix and analyse them statistically.

Procedure:

- A set of cards is prepared. Each card contains a picture of a local animal with biological, cultural or economic importance. These animals have to be selected during the preparatory work (Methods group 0). The number of animals/cards may be very variable, but between 30 and 50 is a good number of species to be represented.
- If the group is composed by more than 5 participants, prepare 2 identical sets of cards.
- In group, participants will be asked to name each one of the animals represented in the cards. The name will be written down in a label and stick it to the card.
- If more than 5, divide the participants group in sub-groups of 3-5 persons.
- Deliver a set of cards to each sub-group.
- Mix each set of cards so they are arranged randomly.
- Ask the participants to organise the cards in 5-7 piles according to their similitude. Put together all the animals that are alike. Do not mention any value or characteristic on which they should put attention, just that the animals must be alike.
- If someone thinks that any animal belongs to more than one pile, create an additional card with the name of the animal, to place it in the corresponding pile.
- Likewise, if someone thinks that in any pile an animal is missing and it is not included in the cards, create another card with the name of such animal and include it in the pile.
- Once the group or sub-groups have finished the organisation of the cards piles, participants will be ask about the characteristics that led them to group the animals in such way. They will also explain what are the differences between the piles.
- The facilitator or other designed person, will register the results of the cards classification and the information about the similarities and differences.
- Invite the members to each sub-group to take a look at the results of the other sub-group, to reflect about the differences of the results, the reasons of such differences, etc.
- After this, results will be tabulated in a similitude matrix. Such matrix is built as the following example:

<table>
<thead>
<tr>
<th></th>
<th>Scorpion</th>
<th>Snake</th>
<th>Pheasant</th>
<th>Tucan</th>
<th>Ocelot</th>
<th>Jaguar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snake</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pheasant</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tucan</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- In the matrix, the pairs that are found in the same pile, are allocated with a number '1'. If both elements of the pair are found in different piles, the correspondent matrix cell is given a '0'.
- Once the matrix is filled, participants are asked to go back to their groups and split the each piles in two piles more. This secondary arrangement will be registered using the same matrix, assigning an additional '1' to the pairs that are still together after the second arrangement.
- Ask the participant to divide each pile in two more, and register the results in the matrix.
- If the participants are interested, piles can be divided over and over again until getting individual cards. But if there are time constraints and the team energy is low, the group can stop on this third division and draw a dichotomous tree that show the organisation of the animals in piles and sub-piles. As the group is drawing the tree, participants are asked if these groups are given any local name.
- Due to the amount of information that this exercise provides, 20 or more repetitions are needed (20 or more individual participants) to have statistical reliability in the results. The exercise as presented here provides a common and initial appreciation, but if possible, this can be repeated with individual informants.

<table>
<thead>
<tr>
<th></th>
<th>Ocelot</th>
<th>Jaguar</th>
<th>Bat</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The matrix above shows the distribution of animals in piles.
Annex 8: Literature review and knowledge dialogue

Objective: The research team (facilitators and community researchers) to have a good knowledge of previous studies and works relevant to their research topic and fieldsite.

Method: This process allows to have a locally relevant review of existing literature on fauna diversity and on selected species natural history. Likewise, it allows to compare and complement traditional ecological knowledge with the available academic knowledge.

Procedure:

- Prior to the session, the facilitator will search, compile and summarise publications on regional fauna diversity, ecology, natural history.
- Also prior to the session, the facilitator will prepare graphic presentations of the summaries, using the available material and resources, such as pictures, drawings, power points, films.
- During the session, and if it has not happen before, the group discusses the importance of a literature review in the context of biodiversity research, for example by demonstrating an important finding that scientists have made and that informs the community’s current use of animals or other resources.
- The facilitator then explains what a literature review is (a critical assessment of how previous research relates to the present research process) and describes the process for creating one. While the community researchers will briefly learn how to do a literature search (online, libraries, etc.), it is unlikely that they will have easy access to scientific literature. Here it is suggested that the research team determine a mutually agreed process for the facilitator to share relevant literature with the community researchers as and when it emerges or is discovered.
- The facilitator stresses the importance of discernment when reading from varied sources.
- Based on the previous theoretical overview, the facilitator presents summaries previously prepared.
- The facilitator promotes a problematising dialogue throughout the presentations. And the group discusses the validity (or not) of the results and arguments made in each main publication, in terms of:
  15. Whether they think the results/arguments are accurate given their knowledge of local diversity, ecology, etc.
  16. Whether they think the body of data/arguments are relevant to answer their own research questions.
  17. How they think the information can be used in their research process.
- Responses are written up in a table format on a flipchart page. The following format is suggested, although research teams are encouraged to develop their own mode of systematising the literature.

<table>
<thead>
<tr>
<th>Publication</th>
<th>Results</th>
<th>Argument</th>
<th>Relevance</th>
<th>Accuracy</th>
<th>How will we use it?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It may be that some publications focus more on results while others develop more structured arguments, so it may be that some of the table's boxes remain empty.

- Given that an academic literature review is unnecessary in a community context, we suggest that a locally-relevant one be built, using a simple spreadsheet computer programme and based on the information contained in the flipchart:

<table>
<thead>
<tr>
<th>Publication</th>
<th>Summary</th>
<th>Results</th>
<th>Argument</th>
<th>Relevance</th>
<th>Accuracy</th>
<th>How will we use it?</th>
</tr>
</thead>
</table>